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WHITHER AND HOW?*

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Anyone not knowing us and reading the programme of this convention would conclude that we are simple, harmless servants of the State whose energies are absorbed in an endeavor to improve animals and plants and an attempt to live within our incomes. To the socially prominent we commonly appear to be rather futile underpaid men, content to spend ourselves groping blindly amid the mazes of the unknowable and perpetually engaged in defending untenable opinions concerning matters of no importance. It must indeed be difficult for anyone who measures his record against the ordinary yardsticks of success to understand the temperament of one who reckons his life well spent if at the end he can leave a record that shall say "Do not follow this track; I have travelled along it and it leads to nowhere". This is not failure, for the wanderings of the one brings others nearer to the goal. It is not to be expected that those who, through their labours, seek tangible memorials of their success shall easily appreciate the point of view of one who is readily content to spend himself in throwing a few solid clods of unimportant discovery that he has been permitted to make into the huge bog of present ignorance, finding exquisite pleasure in the thought that through his efforts and those of others like unto himself, this morass will ultimately become solid ground across which mankind shall pass onward towards its destiny.

On occasions such as this we can disclose our thoughts one to another. We are content, and not a little proud, to belong to that company of men in whom reason is the greatest and the most terrible of passions, the congenital sceptics, the slayers of the false, the dreamers of dreams, the most dangerous of men, the real revolutionaries, the deicides, the most romantic figures of today. We know that science, in the service of which we are enrolled, is the most influential factor in human thought and action today and that it is giving to mankind the mastery over space, time, matter, over life itself. We hold the view that science, that orderly progression of ascertained knowledge, is the only thing in the history of the world that has ever made any lasting contribution to the permanent advancement of man's wellbeing.

We know that we are privileged people in that we lead the life we choose to lead and we acknowledge our responsibilities. It is generally accepted nowadays that a certain standard of material prosperity is indispensible for

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the intellectual and emotional advance of individuals and of peoples and that there can be no real cultural progress until the level of the material aspects of social life is raised. The leaders of the peoples are teaching that the improvement of the material aspects of the social environment is the most effective means to social progress and that through science alone can mankind hope to control its environment and so bring opportunities for cultural development within reach of all. And so it is that governments are organizing opportunities for the reinforcement of the crafts by the sciences. We are employed for the purpose of making the farmer a better farmer because the statesman rightly holds the view that the better farmer a man becomes the better man he may become.

We gladly and earnestly hope that through our labours knowledge of use to the agriculturalist may emerge but we expect that this knowledge shall be used wisely. It will not satisfy us that farming shall merely become more efficient. Efficiency will never be enough; it must be used by man for the provision of opportunities for the exercise of his faculties at the highest pitch in work and in ample recreation. Unless all this search for utilizable knowledge brings to mankind greatly increased capacity for feeling and for thinking it will not have been worth while. We must never forget, amid our busy activities in the search for specific knowledge and new remedy, that behind all this detail there is ever to be sought a body of general principle. Unless we are careful we shall come to know far too much about far too little. One of the most urgent of social problems is to discover the proper method of training men like ourselves, specialists, experts in particular regions of thought. Knowledge at the present time is becoming professionalized: effective knowledge is professionalized knowledge supported by a restricted acquaintance with other useful subjects subservient to it. Our present training moulds minds into grooves and each specialism makes progress but it is progress in its own groove. There is little, if any, contemplation of the complete facts. Commonly we are quite clever but only exceptionally are we wise, for wisdom is the consequence of balanced development. The specialized functions of the community are performed more and more efficiently as this system of professionalization of knowledge spreads, but the generalized direction of the community would seem to lack vision.

As a result of this recently developed interest in science and in us on the part of the State we have become socially important and in this fact lurks danger. In older days the philosophers dedicated themselves to the search for the meaning and the purpose of creation of worlds and of mankind. Their great generalizations began with 'why' and they asked for final solutions. Today the scientist seeks not for the ultimate truth but only for an understanding of the mechanisms which underlie the phenomenon of life and the attributes of living and non-living nature. He has not so much interest in the possible purpose of creation as in the methods whereby this may have been achieved. The questions which gripped the minds of the older generations are still unanswered, but we of today are fully occupied with our own interests and are sufficiently human to forget, or else to ignore, such problems as we cannot hope to solve. It is too commonly forgotten by those who seek to harness science to the chariot of the State that science no longer seeks wisdom but only knowledge.

Society insists on demanding from us just that which we cannot give—it does not ask for facts but only for endorsement for some particular prejudice that is precious to it, by someone of authority. The voice of the scientist is now heard in the councils of those who are fashioning policies. Nothing will please the people but that someone shall be elevated into a position of authority on policy-making and, sad to relate, most of us are too vain to resist the temptation to utter dogma. Now to use facts intelligently requires a set of qualities somewhat different from those which enable a man to discover facts; one can know everything about the chemistry of chlorophyll and yet miss the magnificence of spring. For the making of policies what is wanted is an artist with a knowledge of the materials of science. If we have suffered from our training so that in us serious thought runs in a groove and the treatment of all the rest of life's interests is superficial, then we should restrict ourselves to the making of the threads of knowledge and leave the task of weaving them with the warp and woof of the social fabric to others, if such there be, whose intellects do not lack balance. It is too often the case that this task of direction, of coördination, is left to such as lack either the force or the character to succeed in any definite career and who for this reason apparently adopt all knowledge and all wisdom as their specialism. The notion is still prevalent that a man can be educated and yet ignorant of science whereas it ought to be accepted that no one is competent to occupy any superior position in any organization that depends on scientific work to any considerable extent, unless he has enough training in science to be able to listen intelligently to scientists. Administration itself must be scientific, objective in outlook, if it is to stand the test of modern conditions: it must aim continually at systematization and functional organization. The administrator needs breadth of knowledge, the scientist needs depth and the two are mutually complementary and both need the same kind of preliminary training in order to acquire the requisite outlook. A knowledge of the administrative machine is not enough for such as have to deal with professional scientists, for they must know the human material with which they are dealing, otherwise their judgment is worthless. The idea that expertness in science is irreconcilable with skill in administration is but a repercussion of the times when, because science was not, all scientists were cranks. It is time that this notion was finally dispelled.

There is commonly a conflict of opinion between scientist and administrator but that this is so is to be regarded as evidence of human frailty. Either a man knows or else he does not know. It is tempting to present a purely personal opinion as a solidly established scientific verifiable fact and it is by falling to this temptation that many a scientist has prejudiced his position and his influence.

We are keenly interested in the use to which the results of research are put. We are impressed that in the past the reactions of science upon civilized society have been, to say the least, unfortunate. The power that knowledge has given has been used mainly to destroy, to exploit the weak, to retard the development of the grandeur that intelligent man could achieve. We are no longer content to see the efficient tools that science has fashioned used by inefficient fools to achieve their own unglorious aims. We demand

that scientific knowledge shall be used scientifically in the service of mankind. Thus far too much stress has been laid upon the materialistic basis of science and too much attention has been paid to things and too little to values. All thought concerned with social organization has expressed itself in terms of material things and in such an atmosphere the industrial revolution took place. The world still is suffering from the unnecessary evils that attended this. There has been too much muddled thinking. Industrialism turned to biology for justification for its attitudes and not in vain. The notion that filled the 19th century was that of the struggle for existence and this took the form of class warfare, international warfare, commercial competition, and, when appealed to, biology seemed to show that it was both natural and right that the strong should devour the weak. But we today register our protest against the interference by social and other demands in the development of biological philisophy. Biological thought has been prostituted in the past; we must guard it in the future. It seems that this interpretation was quite wrong and that the successful organisms are such as modify their environment to suit themselves and themselves to fit their habitat. A struggle for existence occurs only when the environment is fixed and unmodifiable. Canada could maintain only a scanty population of Indians who passively accepted their environment: the European immigrants coöperated in modifying their environment with the result that a population many times as large now occupies the same territory and there is room for millions more.

It appears also that diversity of types of living things and of environments, and not uniformity, is necessary for the continued success of a people, for in such diversity lies the opportunity for great adventure. It is now recognized that a diversification among human communities is essential for the provision of the incentive of adventures of thought, passionate feeling and aesthetic experience. When mankind ceases to wander and no longer encounters novelty then it will stagnate and degenerate. It is because the Empire is so magnificent a field for adventure, physical, emotional and intellectual, that it is so important and so precious to all of us.

It is true that the destiny of mankind is being determined by man, deliberately or unwittingly, and that the future lies not in the lap of the gods but in the dreams of responsible men and women of today who are fashioning the tools—the children of tomorrow—that shall blaze the trail and water the road along which mankind shall pass. But as yet we do not know what we wish to do with mankind and with society nor do we wish sufficiently to do anything.

We are gaining a knowledge of the laws of nature, and securing the power to direct and control its further evolution but to guide this development is far simpler a task than to decide upon the ultimate goal. This decision will be made by science. It is now fully recognized that the sum total of the influence of the men of action upon human affairs shrinks to insignificance when compared to the effect produced by the long line of men of thought, men individually powerless but ultimately the rulers of the world. Mendelism will influence humanity far more than will the victories or the defeats of Napoleon.

We have to recognize that in every field we explore two principles are at work: the spirit of conservation and the spirit of change. Conservation without change is meaningless. Change without conservation becomes merely the transition from nothing to nothingness. The secret of success, as the biologist sees it, lies in the ability to incorporate the new into the substance of the old. We must welcome change, opposing all attempts to make life placid and forcing the commercially prosperous to face the need for the intellectual reform which the acquisition of new knowledge has created.

Consider for a moment possible trends in agriculture—a field with which all of us are more or less familiar. Thus far in the world's history the dominant concept of the ideal organization of society has been that of a stable agricultural community. It is not improbable that we are too content to accept this point of view without questioning and that we share in the opinion that a rural organization is the highest as well as the final form of society. But is it? We must not overlook the fact that all the evidence there is points to the conclusion that the agricultural organization is giving place to the industrial and that the final form will be a stable urban society. Slowly but inevitably as a country writes its history, its people become urbanized. Further it is becoming recognized that the evils of urbanization are not inherent in the system itself but are due to the faulty application of science to human affairs. Those who cry "back to the land" and who regard industrialism as inherently degrading are ignorant of the power over the material endowment that science has even now given to mankind, and have no faith in any but themselves.

To one who knows the power and the precision of the machine and who looks upon machinery as the means whereby man shall be liberated from the slavery of uncreative joyless labour, it surely must seem that urbanization is a condition ardently to be desired. It is not improbable that those peoples which first attain a stabilized industrial organization, served at every point by science will be supreme in the councils of the world. It is not fantastic to hold the view that soon that which animals produce on the farm will be made by man in the factory. Agriculture is largely concerned with the production, by relatively expensive and inefficient means, of certain physiologically active substances we know as foods. It is agreed that in the last analysis these are the products of plant life, and that we, because of our peculiar anatomy, are forced to get them by devious means, by way of animal products. For the present animals are a necessary stage in food production for the reasons that the plant converts its sugar not into starch but into cellulose and that the hoofed animals can do what we ourselves cannot do—break down this cellulose into assimilable by-products by means of bacterial action. It follows that we could dispense with the animals in this matter of food production if we could develop intestinal tracts like theirs, a most undesirable ambition, for though we wish to retain the pleasure of eating we must desire to reduce its physiological expensiveness, or else if we could replace the stomach of the ruminant by the vat of the chemist, and this is what most surely will happen. The time will come, and it will not be long delayed, when much of what we eat will have been manufactured synthetically. Bacterial action in the vat will provide sugar and starch whilst

protein will be secured from some such source as atmospheric nitrogen. The tin opener will usurp the place of the poleaxe and the byre and abattoir will be supplanted by the garden and the factory.

If and when it is shown that urbanization confers upon a community greater leisure and greater opportunities for spending this profitably than can an agricultural order, then surely we must strive to further its development. We must not, simply because we are interested in agricultural activities to our personal profit, actively or passively mislead those who look to us for guidance. We must examine with the utmost care this question as to whether or not an agricultural order of society is the highest and final form of social structure or merely a stage in the gradual evolution of desirable urbanization.

Whatever may be the answer to this question it is manifestly a fact that for the present at least agriculture is Canada's chiefest interest and that to its service considerable numbers of professional scientists have been attracted. The most conspicuous factor in the history of civilization during the last 200 years has been the exploitation of physical nature by means of scientific knowledge. Science has provoked and made possible a complete metamorphosis of the civilized world. This has been due to the fact that science has been nurtured by industry. The present day universal appreciation of science in relation to the practical affairs of life is but the repercussion of the industrialization which followed upon commercial developments during the period 1600 to 1750. It was found that industrialism is a state of society that can continue only if and when trained scientists are employed in its service. It is because man has gained so spectacular a control over his physical environment that science exercises such a dominant influence in our culture today and it is because commerce has encouraged the development of the physical sciences for its own end that chemistry, physics and allied sciences have grown so amazingly.

The progress of the biological sciences has been relatively tardy for the reason that commerce has not encouraged their development until quite recently, when the urgent demand of agriculture began to provoke intense activity in the various biological subjects. There was a time in agriculture when tradition, handed down from generation to generation, was sufficient to command success but this time has passed, for discoveries in various departments of knowledge which would seem at first sight to be quite remote from agriculture have made the farmer dependent upon information that cannot be acquired upon the farm. Furthermore the economics of farming, formerly relatively stable and therefore to some extent negligible, are continually changing and so tradition must ever be reviewed and commonly discarded. No particular agricultural practice is good in itself but only in relation to the prevailing conditions of markets, climate, soil and so forth and the only real test of the value of a method or of a policy is that it shall be successful in the circumstances in which it is practised.

It is because the biological sciences have already grown so large that they must grow larger. Investigation, the search for new knowledge, must ever continue. The march of science cannot be stayed save by the waves of an antagonistic religious fervour and additions to knowledge must continue to disturb agricultural practice more and more.

The twentieth century belongs to biology, for though in the past man's control has been over inanimate things, now the conquest of living nature has begun. It is the science of biology which today occupies a pivotal position in human understanding. The life of every man is affected in all its aspects by the two great generalizations of this science—the theory of the cell and the theory of organic evolution. The historian now constructs a biological background for historical events, the theologian seeks biological interpretations for the developments in theology and the philosopher acknowledges the biological foundations of his subject. The ordinary man is interested in the biological nature of his own existence. Biology more than anything else today is fashioning human thought. Man's concept of himself has changed from that of a being recently created and fearfully awaiting an awful day of reckoning in a not too distant future, to that of a being originating as part of organic nature and set in a universe without beginning or without end. This intellectual revolution has liberated countless men from the bondage of authority. Credulity is no longer accepted as a virtue nor is doubt any longer regarded as a sin.

Belief must now rest on evidence that is open to criticism and critical judgment has usurped the place of authoritative statement.

The attitude of mind of the scientist has contributed no less than have the facts of science to the modern outlook of society. Social disharmonies are no longer regarded as the inevitable consequence of a particular model of social structure; they are looked upon as instances of imperfect organization. Man is no longer content to allow natural forces to work their will upon him. He is the rebel among living things, ever challenging nature, bending it to his will. The stage is set for the next act in the drama of social progress. We await the entrance of the leading man.

Man's dominion over nature has always depended on the plasticity conferred by intelligence and by the power of rapid learning. The future of mankind and of society will be determined by the use he makes of these. The action of the slow wasteful blind forces of natural selection has resulted in the production of the truly marvellous living mechanism. When man applied his intelligence and experience to the task of changing the characterization of his animals and plants his achievements were secured much more rapidly than were those of nature. If he knew what he wanted, and if he wanted sufficiently ardently, he could achieve similarly rapid advances in the further evolution of his own species. So far he has avoided any project of this magnitude merely contenting himself with applying mere palliatives to the sores of social disharmonies.

Mankind will soon have all the important mechanism as his slaves. Man is sufficiently intelligent to know that the only things that give any real and permanent satisfaction are periods of the employment of one's faculties at the highest pitch, alternating with periods of recreation of the mind in meditation, conversation, literature, music and art. If man can only learn to feel intense dissatisfaction with his own nature and with the present social structure and to wish to change these things he can double the span of his life, increase his average health tenfold and enhance his capacity to learn and to enjoy a hundred times. There is no insuperable difficulty in the way

of raising the average level of intelligence, artistry and creative power to that of such as today are regarded as individuals of exceptional ability. If man so wishes and wishes sufficiently ardently he can command a life rich enough and long enough to make it a thousand times worth the living.

But the best pleasures can only be secured at the price of common endeavour and of voluntary submission to a common aim. What is this aim to be? Today too many men waste the energy of their ideals on the world that is to come. It is high time that this energy were used to transform the world that is. But this cannot be until reason is regarded as one of the cardinal virtues, until the scientific attitude of mind is the common possession of all. Then man will cease to spend his substance in the unending endeavour to support life and will devote himself seriously to a consideration of the much more fascinating problems of how to live and of what to live for. When this is a common interest, science is ready to show what man may do in order to achieve this worthy aim.

THE EFFECT OF THE COMBINED HARVESTER-THRESHER ON FARMING IN A WHEAT GROWING REGION*

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The introduction of the combined harvester-thresher in the Great Plains states has resulted in changes in farming conditions that are far-reaching in their consequences. The general use of this one machine in harvesting wheat is contributing to changes that affect not only the economic life of the people but the social and political life as well. The combined harvester-thresher is not solely responsible for these changes but it is undoubtedly the most important single factor in causing these changes. The programs of agricultural research agencies within the region are being reconsidered and certain portions of them revised as a result of these changes.

The combined harvester-thresher was probably first used in the Great Plains of the United States about 1917. Increasing labor costs and the reduced man power of farms under the stress of war conditions induced a few adventurous farmers to experiment with this machine which had been used successfully for many years in the Pacific Coast states. The machines proved sufficiently successful that other farmers and some of the implement manufacturers became interested and the number of machine in use has rapidly increased. It is estimated that in the heart of the hard winter wheat belt at least seventy-five per cent of the 1929 wheat crop will be harvested with combines if favorable weather conditions prevail. Estimates of the number of machines in use on Kansas farms vary from 16,000 to 20,000 and more for the 1929 harvest.

Natural conditions in the Great Plains region have been favorable for the use of the combined harvester-thresher. The level topography makes possible large, level fields. The prevailing soil types are residual and loessial in character and are free from stones that might be a handicap in using a combined harvester-thresher. The hard winter wheat varieties grown usually ripen fairly evenly. Weeds seldom are troublesome in the wheat fields at harvest time. The harvest season is usually dry, thus making possible the harvesting of the wheat in good dry condition in most years. However, in a few years, such as 1928, excessive rainfall at harvest time has caused serious difficulties.

The combine has materially reduced production costs by cheapening the harvesting of the grain. Less labor is required, the operation is accomplished in less time and other farm work is facilitated by the use of the combine. Studies of the cost of harvesting and threshing wheat where binders, headers and combines were compared reveal the advantage of the combine, particularly on the larger acreages. Where as much as 500 acres of wheat were harvested, the cost was $4.41 an acre with binders, $3.44 an acre with head-

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ers and $2.18 an acre with the combine.* These figures include threshing charges but do not include the cost of hauling the grain from the field to the farm bin or the local elevator. The number of men needed for the harvesting operation alone varied from twelve where headers were used to two where the combine was used. Threshing crews and haulers of the threshed grain would add to the number, but for headed or bound grain would come at a later time. The total crew required with the combine, including the grain haulers, would be three to five men compared with twelve for the same area harvested with headers.

The advantage of the combine increases as the area to be harvested is increased. In the study just referred to the cost of combining one acre of wheat was $4.91 where only one hundred acres were cut with one combine. When two hundred acres were cut the cost was reduced to $3.20 an acre, at three hundred acres the cost was $2.64, at four hundred acres $2.35 an acre and with five hundred acres cut with one combine the cost was $2.18 an acre. This has given the operators of the larger farms distinct advantages in the form of lower costs. The farmers with the smaller acreages have quickly realized this and a shift in the size of farms has occurred which will be discussed later.

Prior to the advent of the combine, thousands of harvest laborers came into the Great Plains region annually for the wheat harvest. Physical strength and endurance and a willingness to work were the most desirable characteristics of these laborers. There was much heavy hand labor to be done. The use of the combine has materially reduced the number of such laborers needed and has changed the type of laborer best adapted to the needs of the harvest. Many and probably most of the harvest hands of the present in the hard winter wheat belt are permanent residents of the region as contrasted with the transients of earlier years. High school and college boys who are home for the summer, and men from nearby towns constitute much of the additional harvest labor required. Hand labor is no longer the chief characteristic of the wheat harvest. The men needed at present should be mechanically trained. A combine operator, a tractor operator and one to three truck drivers constitute a usual harvest crew. It is needless to say that this change has had profound influence upon both the farm home and the rural community. These changes will be discussed more fully later.

The use of the combine has encouraged greater use of better methods of seed bed preparation. Experiments conducted by the Kansas Agricultural Experiment Station at Manhattan for more than ten years show that early plowing (July 15) for wheat under continuous cropping as well as with wheat in rotation results in an average increase in yield of approximately nine bushels an acre compared with late plowing (September 15).† The combine removes the crop from the field and seed bed preparation usually is started immediately. The tractor used to pull the combine is frequently used to pull plows or listers early in the morning and late in the afternoon

*Kansas Agricultural Experiment Station Circular 142. "The Effect of the Combined Harvester-Thresher on Farm Organization in Southwestern Kansas and Northwestern Oklahoma." 1928. By W. E. Grimes, R. S. Kifer and J. A. Hodges. Page 12.

†Kansas Agricultural Experiment Station Technical Bulletin 18. "Tillage Investigations Relating to Wheat Production." M. C. Sewell and L. E. Call. Page 44.

when the standing grain is too tough to combine satisfactorily. In this way many farmers complete plowing or listing for the next crop within a few days after harvest is completed.

Increased use of tractors has occurred with increased use of combines. Few wheat farms are without tractors and many of them have trucks. The one-way disk plow has rapidly increased in importance in recent years. The lister has been used as a rapid method of preparing the seed bed but it is losing favor with many farmers because of its tendency to leave the land ridged. This makes it harder to operate the combine unless the combine is always following the ridges instead of crossing them.

Much equipment has become obsolete as a result of these changes. Threshing machines, binders, headers, header barges and other implements are now idle and frequently useless to the farmers. Substitute equipment has developed which appears to be adapted to use with the combined harvester. The one-way disk plow and the swather are newer pieces of equipment developed chiefly as a result of the use of the combine.

The swather, which cuts the grain and deposits it on the stubble in a narrow windrow or swath, was first used on a general scale in the Great Plains region in the harvest of 1928. Excessive rainfall materially accentuated the difficulties of that harvest. The swather was used by a few farmers who reported excellent success with it. Many farmers are now planning to use the swather more extensively in the 1929 harvest. It can be used as soon as the grain is ripe enough to bind. This will give five to seven days use prior to the time when the wheat can be combined. Then with ten to fourteen days direct combining followed by five to seven days with the pickup on the combine threshing the swathed wheat, the period of use of the combine will be approximately doubled and the acreage handled by one combine correspondingly increased. Lowered cost should result and also increased profits unless the quality of the swathed grain is materially reduced. Weed growth would rarely be a problem in threshing this swathed grain unless it is left on the ground for more than three or four weeks.

The coming of the combine, the tractor and other power machinery is materially affecting the organization of farms in the Great Plains region. The reduced cost of producing an acre or a bushel of wheat where a sufficient acreage of wheat is grown on one farm to permit the use of a combine at near its maximum capacity, which for the machine with a cutting width of fifteen or sixteen feet is 500 to 700 acres or possibly more where the swather is used, has encouraged many farmers to increase their wheat acreage. This is done by reducing the acreage devoted to other crops in some instances but more frequently by renting or purchasing additional land. The result is evident throughout the Great Plains region. Farms are steadily becoming larger. In one township where the combine has been adopted by practically all farmers the average size of farms doubled and the number of farms decreased one-half in less than five years. This movement to increase the size of farms results in many abandoned farmsteads. The buildings that can be used for the storage of grain or machines usually continue in use. Other buildings are rapidly depreciating and will probably be taken away within a few years.

This increase in the size of farms has its counterpart in the earlier movement when headers displaced binders. The header made it possible and desirable for one farmer to grow more acres of wheat. The size of farm was increased from that best adapted to the binder to a size more nearly fitting the header. Now, with the general adoption of a new machine, the combine, which makes a larger acreage of wheat for a farm desirable, the size of farm is again increasing.

In the Great Plains region the size of farm has been increasing for many years, where general farming has been followed. The original homestead was, in most cases, too small in area to permit of efficient operation. Economic forces have been slowly causing changes and the coming of the combine and of the accompanying tractor has materially accelerated this movement.

The larger farms that appear to be coming and in many localities have arrived, are not larger in terms of the man power required to operate them. They are, on the other hand, materially larger in acreage and in terms of motive power. These farms still tend to remain family farms or farms of such a size that the usual family can operate them with relatively little hired labor. The acreage that one man can handle efficiently has been materially increased by the introduction of power machinery.

Farms operated by corporations on an industrialized plan have sometimes been suggested as an ultimate consequence of this movement toward larger farms. The facts to date do not seem to warrant this assumption. There are many large farms operated by their owners or tenants but only a very few operated under corporate management. The handicaps of the corporation farm are numerous and will, in all probability, tend to keep their number and importance at a minimum. Their unusual character seems to have secured for them much more publicity than would be in keeping with their number and importance.

A movement that has resulted from the more general use of the combine but which has been comparatively little noted is the bringing of new land into crop production on the southwestern edge of the hard winter wheat belt. Regions that formerly were virgin prairie have been broken out and are now farms with thousands of acres of wheat. No definite figures on the acreage of new land brought into crop production in this region are available but it is estimated by those who are in the best position to make such estimates that it exceeds ten million acres.*

This new land formerly was submarginal for crop production. New machinery, better adapted varieties of crops, and improved production methods have brought it above the margin and it can now be profitably cropped. Much of this land was broken from the prairie sod during the years 1921 to 1923, the period of greatest agricultural depression and when wheat prices were near their lowest point prior to 1929. The present low prices of wheat do not seem to be discouraging the breaking of more sod for newly broken areas are to be found frequently in the western portion of the hard winter wheat belt. Figures for the western one-third of Kansas illustrate this move-

*"The Wheat Situation, a Report to the President", by Henry C. Wallace, Secretary of Agriculture, transmitted November 30, 1923. Pages 53-56.

ment. The area seeded to wheat averaged 1,970,202 acres for the years 1913 to 1915; 2,704,958 acres for the years 1917 to 1919; 3,351,398 acres for the years 1921 to 1923; and 3,442,000 acres in 1925*.

The coming of the combine in the Great Plains region has not increased diversification of farming enterprises. The tendency at the outset of the movement has undoubtedly been in the other direction. However, as adjustments are made it is probable that more diversification of farm enterprises will result.

The yields of wheat where the combine is used show no tendency to decline. In fact, it is probable that they have been increased by the use of better methods, better varieties and by the elimination of some of the less efficient wheat growers through the relentless competition characteristic of agriculture which, in the majority of instances, results in the survival of the fittest.

The harvesting of hundreds of millions of bushels of wheat within two to three weeks in the Great Plains region has produced marketing problems of the first magnitude. All of this wheat is ready to move directly to market and much of it does go directly into terminal markets. This pressure upon terminal marketing facilities is illustrated by wheat receipts at Kansas City. The average receipts during July for the ten year period 1919-1928 were 11,469 cars. They did not exceed 15,000 cars until 1926 when 22,821 cars arrived in July. Again in 1928, receipts climbed to the unheard of figure of 24,868 cars. This movement of wheat was earlier and heavier than in any previous year and the increased use of the combine is the generally accepted explanation of it.

Terminal elevator facilities have been increased and are still being increased at the terminal markets within and near the hard winter wheat belt. These facilities have proved inadequate, particularly in a wet harvest such as was experienced in 1928.

The use of the combine has increased the local elevator problems. They are now called upon to handle the bulk of their business within a few weeks and frequently find their equipment and facilities inadequate. This is particularly true when much of the grain coming from the combine is high in moisture content as was the case in 1928. The farmer did not wish to store this grain on his farm for fear that it would heat. He did not wish to delay combining since the uncertainty of weather conditions increased the hazard of losing the entire crop that was standing. He combined his wheat when it was too wet, knowing exactly what he was doing and then took it to the local elevator and sold it at whatever price he could get. He proceeded on the theory that a load of wet grain sold at whatever price he could get was better than no returns for wheat left in the field and never harvested because of unfavorable weather conditions. Under such conditions local elevators have been unable to give satisfactory service.

In years of better weather conditions at harvest time local and terminal markets are not quite so congested but even in these years, adequate service cannot be given and facilities are insufficient.

*"Some Phases of the Hard Winter Wheat Problem in Readjustment.' W. E. Grimes. Journal of Farm Economics, Volume VII, No. 2. April 1925. Page 202.

As a result the farmer who produced high quality wheat has received less than his wheat should have returned him and the producer of low quality wheat has benefited by the average price that too frequently is paid under these congested conditions. It is pretty generally conceded that premiums for quality wheat cannot be reflected to growers during the rush of wheat to market at harvest time.

The transportation facilities have been taxed to the utmost in moving this combined wheat. The following quotation from the report of the Superintendent of Transportation of one of the principal grain hauling railroads of this region to the Trans-Missouri-Kansas Shippers Board at its meeting at Wichita on June 20, 1928 will illustrate the strenuous efforts made by this and other railroads to take care of the excessive traffic peak caused by the movement of combined wheat:*

"We have Santa Fe box cars conditioned, made grain tight and stored in the grain belt to the extent of 14,979 cars, which does not include a three-day working supply of 2,972 Santa Fe and 1,002 foreign box cars that are also available for wheat or any other kind of loading, making a total of 18,953 box cars available today. In addition to this we have in the grain territory 2,488 automobile cars, 50 per cent of which, or 1,244 will be pressed into the grain trade, making a total of 20,197 cars available which is 5,200 cars more than we ever had available at the beginning of a wheat movement. We purchased 1,500 new 100,000 capacity box cars this year, 1,500 last year and 1,000 in 1926, or 4,000 cars in the past three years. We have been concentrating our repair forces on bad order box cars for the past three months with the result that our bad order box cars today are at a very low ebb. We have an abundance of power in service and 234 other engines laid up in good order, so that there can be no possible chance for our not being able to take care of the crop from a power standpoint."

The railways have made strenuous efforts to handle the wheat movement and the results have been gratifying. However, with the number of combines still increasing, there is grave question concerning their ability, even under the most efficient management, to handle the movement in a heavy harvest.

The changes previously discussed have dealt with economic conditions. The changes do not stop here, however, but affect the social and, to a lesser extent, the political life of the people. The reduction in the number of harvest hands required has improved conditions in the farm home. In the earlier years, the harvest hands were of a motley character and the farm family always drew a sigh of relief when harvest was over. Now many farmers harvest 300 to 600 or more acres of wheat with no help from anyone outside of the family. Harvest does not disrupt the home life of the farm family.

The increased size of farm is, of course, reducing the farm population. Fewer farms mean fewer farm families and a smaller total population. Schools, churches and towns are feeling the effects of this reduction in farm population. Schools have fewer pupils. Some of the more extreme cases

*Report of H. R. Lake, Superintendent of Transportation of the Atchison, Topeka and Santa Fe Railway in the proceedings of the Trans-Missouri-Kansas Shippers Board for the meeting held at Wichita, Kansas, June 20, 1928. Pages 40-41.

of this in Kansas were described in the following words by the Kansas School Code Commission in its Report to the Legislature:*

"During the school year 1927-28 there were six schools in session with no pupils enrolled, fifteen with one pupil each, thirty-four with two, sixty-eight with three, one hundred thirty-two with four, and one hundred fourteen with five, or a total of three hundred sixty-three with five pupils or fewer enrolled."

The school problem remains practically unsolved. Various efforts to improve the situation have been made but insufficient progress has been made to indicate the probable outcome.

The towns have fewer customers from farms as a result of the reduced farm population. On the other hand, the change has worked to the advantage of the townspeople in at least one respect. In the years preceding the adoption of the combine the credit accounts of farmers with local merchants were heavy. These accounts sometimes went from harvest to harvest and more frequently from the beginning of harvest until threshing time six weeks to two months later. With the combine in use on most farms, wheat can be marketed as soon as harvest begins. A few loads of wheat will bring sufficient cash to pay current bills. As a consequence fewer farms are in need of store credit during harvest and the local merchant's business is more nearly on a cash basis.

With fewer farmers and most of them owning automobiles, rural communities are tending to include larger areas. The logical outcome of this would be larger school districts, and larger political subdivisions such as counties. This movement, while logical, oftentimes lacks expediency since no county seat town has as yet volunteered to step aside and permit another town to take its place. However, this problem is one of local government which ultimately affects the taxation problem. Before much progress is made in reducing local taxes, the question of the justification for and the efficiency of operation of local governmental units must be squarely faced.

These are some of the changes that have come in the agriculture of the Great Plains region with the incoming of the combine and other power machinery. No attempt has been made to make this discussion all inclusive. Rather, an attempt has been made to give something of a picture of the changes that have occurred and that seem probable in the near future.

Out of these changed and changing conditions have developed many problems that challenge the student of agriculture. The technical agriculturist finds problem after problem worthy of his research activities and new problems are constantly arising.

A brief statement of some of the research problems growing out of the increased use of the combine in the hard winter wheat belt may indicate their nature and extent. The straw left on the ground where grown has increased interest in the problem of how this straw may be worked back into the soil to the best advantage and with the least detrimental effects. Tillage experiments dealing with this problem have been under way for some years.

*Report of the State School Code Commission of Kansas. Volume I. June, 1928. Page 10.

Varieties are needed that will ripen earlier, that are free from shattering and that have stiff straw. These problems are receiving the attention of the plant breeder. In addition there are many other agronomic problems in need of study and experimentation. These problems are no less urgent because of the changing conditions.

The moisture content of wheat is of increasing interest and is receiving increasing attention in research programs. The relative importance of internal and external moisture on the wheat kernels at the time of harvest and storage is one problem growing out of the increased use of the combine. The absorption of atmospheric moisture influences the time of beginning and quitting combining in the mornings and evenings and determines the length of the working day with the combine. Farmers are asking how long they must wait following a rain before wheat will be sufficiently dry to permit safe combining. All these are problems concerning which all too little is known.

Types of storage and methods of ventilating stored wheat are receiving attention but the ultimate answers to the questions raised by farmers have not yet been and may never be determined. However, research will bring the research worker and the farmer ever nearer to a solution of these problems. "Sick" wheat has been talked of in trade circles but the conditions causing this difficulty are not fully understood. Undesirable odors in wheat have also been a source of contention in trade circles. The source of these odors is a relatively unexplored field.

Additional storage facilities are needed but no one is as yet in a position to say whether these facilities should be on farms as bins and farm elevators, at local markets as local elevators, or at strategic points as terminal elevators. If terminal elevators are needed where should they be located to serve the wheat industry to the best advantage and at the lowest cost and what equipment should they have for processing wheat that is out of condition? If equipped with drying apparatus, will wet wheat come to them in sufficient quantity year after year to make this equipment a profitable investment? These are problems in need of solution. Some of them will be solved only with the experiences that time will bring. Others may be the subject of experimentation. In either case it is important that experiences be recorded so the greatest number may profit from them.

The size of farms has been increasing but no one, as yet, knows the optimum size when all factors are considered. The crops and livestock to be included with wheat in the farm business are problems confronting every farmer whose business has been affected by these changes. Aid in the solution of these problems is needed.

The problem of using the combine on crops other than wheat is one concerning which the results of some experience are available but more knowledge of the problems involved is needed. Such use is one important way of reducing costs per unit by distributing overhead charges over a larger total output.

The replacement of obsolete equipment with newer, better adapted types always brings up the problem of fixed expense. Many farmers with headers and threshing machines have been trying to determine when they can afford

to shift to the newer equipment. If the older, obsolete equipment is junked it means a loss which must be offset by the reduction in costs effected through the use of the combine. Something is known concerning this problem but more information and study is needed.

The funds required for farming under the newer methods in the Great Plains region present problems for many farmers. The cost of the equipment needed to operate an efficient wheat farm is as great as the cost of an entire farm business in some sections. In addition land must be secured. If this land is to be owned by the operator it means a total farm investment of $50,000.00 to $100,000.00 and often more. Such a sum is greater than the majority of farmers can expect to accumulate in a lifetime. The problem of the future ownership and tenure of land in the hard winter wheat belt is an unsolved one concerning which little definite information is available.

It has frequently been urged that farmers should store more of their wheat on the farm. If this is done to any appreciable extent, additional credit will be required. The sources and terms of such loans and the conditions under which they may be safely granted are as yet unsolved problems.

The agricultural engineer also has problems to deal with. The use of the power take-off on tractors, the sizes of combines and tractors, the operation of combines and many other problems confront the engineer to be worked out by him either alone or in coöperation with other technical men. One need that is now quite evident is stronger frames for power machines to give them greater durability and dependability. The use of the swather is a field inviting the attention of the agricultural engineer as well as of other men in research work.

Nothing has been said of the need for research in rural institutions, in taxation, in transportation and in other fields affected by the changes that have occurred. Such research is needed but time prevents more detailed discussion of it.

It should not be assumed from what has been said that these problems are not now being attacked by the various research agencies in the hard winter wheat belt. Many of them are being studied and many of these studies have been under way for several years. However, much remains to be done. The changes in agriculture have come so rapidly that it has been difficult for programs of research to keep up with them. The Hard Red Winter Wheat Research Conference held at Manhattan, Kansas, on November 8, 1928 and out of which a permanent organization has developed, was recognition of these problems and of the difficulty of studying them rapidly enough.* This conference was attended by farmers, business men and technical workers interested in the wheat industry from the five states of Nebraska, Colorado, Kansas, Oklahoma and Texas and from the United States Department of Agriculture. Its purpose was to coördinate and to further research pertaining to the wheat industry of the region.

In discussing these problems of the hard winter wheat belt which have grown out of the increased use of the combined harvester-thresher, it is not

*See Report of the Hard Red Winter Wheat Research Conference held at the Kansas State Agricultural College, Manhattan, Kansas on November 8, 1928.

assumed that other regions adopting these machines will have the same problems or find similar solutions for their problems. However, it is hoped that the discussion may provoke thought and that an account of experiences in one region may be helpful to research workers in another region.

These problems of the hard winter wheat belt and of the Great Plains region are a challenge to every research worker in the region. The rapidity of the changes insures that this work will ever be needed and will never be done. One problem is solved and two others are presented for solution. It is this dynamic character of American agriculture that furnishes many of the allurements of research work in agriculture.

THE RELATION OF CEREAL PESTS TO CHANGES IN CROP PRACTICE*

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Much has been said, and not a little loosely written, by way of generalization on the relation of crop pests to changes in crop practice. Much more will yet be said and written on the subject and that, too, with little more fidelity to the facts than has characterized the utterances of many who have been satisfied in the past to reason on a basis of appearances rather than facts. This attitude of mind, this disregard for the actual facts, reminds me of an animated conversation between two ex-service men of African lineage. They had formerly known each other but had served in the World War in widely separated regiments. On a warm August afternoon, some years after their return to their native haunts in Alabama, they fell to reminiscing somewhat as follows:

Rastus: "Say, Mose'; did you'-all regiment have a buglah?"

Mose: "Well, I jes' don' *tell* you we had a buglah! Why, evah time he toot dat ho'n, Ol' fader Gab'el jes' set up an' took notice. Did you'-all regiment have a buglah?"

Rastus: "Say, niggah; yo'-all don' know what yo'-all am a talkin' 'bout. Man! Ah'll say we had a buglah! Why, evah time he blow dat bugle, ah say to mah plate o' beans: 'Strawberries, stop yo' pushin' an' a shovin', there; yo' push all dat whip cream off mah plate.'"

Even a casual and hasty consideration of the relation of the biologic factors affecting crop production in America will convince us that this is by no means a single-factor relationship. We shall discover that the factors which have worked changes in crop practice in one section of the country may have differed in part or wholly from those which may have prevailed in another. We shall discover, also, that, instead of radical and permanent changes, mere modifications or temporary readjustments may have resulted in some regions pending the control or disappearance of the inhibiting pest or other cause of the disturbance. We shall find that, aside from the very certain and powerful influence exerted by smuts and rusts and chinch bugs and a host of other parasites, potent economic forces have played and still are playing their relentless rôle. Even such factors as the spirit of adventure and our love of quick and easily gotten gain can not be left out of the picture, for they have made those out on our farming frontiers impatient, even intolerant, of husbandry. They have contributed to a slovenly, slipshod exploitation and have opened the doors of the pest-house.

Other factors we should not overlook relate to the character of our shifting farm population. Wheat-farming Americans and Canadians of British origin here and there have given way to Germans, to Scandinavians, to French- and Anglo-Canadians who know and practice diversification, who

*Lecture at the ninth annual convention of the Canadian Society of Technical Agriculturists, Winnipeg, Man., June 12, 1929.

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love and understand live stock and dairying. And then there are our agricultural colleges and experimental stations. Who among us even dares to predict what will be the wholesome influence on rural life and crop practice yet to be wrought by Macdonald, Cornell, Guelph, Minnesota, Ste. Anne de la Pocatière, by Manitoba and Oka and scores of other like institutions? And last, but by no means least, are our Federal departments of agriculture with all their vast equipment and personnel for research and teaching.

In the preparation of this paper, I have been particularly favored by free access to records on crop production in the United States dating back to the middle of the last century. To be sure, little of a specific and definite character was noted in those early years relative to crop pests. For example, in the United States Patent Office Report for 1847, we find this statement: "It is gratifying to state that there appears to have been scarcely any complaint of the *rust* in the wheat crop of this year compared to many other years. With here and there exceptions, this scourge of the farmer seems to have been comparatively unknown."

In the United States Patent Office Report for 1849, Jonathan Shearer of Plymouth, Wayne County, Michigan, states that "the culture of wheat constitutes the main agricultural business of Michigan. .... During the past 20 years the average weight of my flint wheat has ranged from 60 to 65 lbs. ..... my wheat has never suffered especially from rust." In the Report for 1852, Mr. Laurel Summers of Le Claire, Scott County, Iowa, writing in November of that year, states: "Very fine spring wheat, of the Red River and Italian varieties, and what is called Hedge Row is extensively raised. ..... The Hessian flies and weevils are unknown to the wheat raised here; nothing troubles wheat in this country but smut."

In the Report of the Patent Office for the year 1854, we find the following statements from growers in Marion and Scott counties, Iowa: "No insect has yet troubled our spring wheat and it is entirely free from rust. ..... With spring wheat we are very successful, frequently raising over 30 bushels per acre. The average on my farm for the last seven years is a little over 22 bushels."

And so on down through the years to the late nineties, the reports, even those made by technically trained observers, too often fail to specify the rusts, the smuts, and the insects peculiar to cereal crops. Without that specific knowledge, one can not make an entirely satisfactory analysis of the influence of such inhibiting factors on changes in crop practice.

If we subject our problem to a critical and fundamental analysis we shall be forced to admit that insects and fungi have played an important rôle in changing crop practice. But we shall find also that many of these pests have flourished and seemingly established themselves permanently through the continued exploitation of lands formerly of unsurpassed fertility. Much of our farming—far too much of it—still is more a species of plunder than husbandry. One has but to recall the continued practice, in certain of our Corn-Belt States, of drilling winter wheat and spring oats and barley into non-plowed land among standing cornstalks. An equally condemnable practice is that of sowing seed without proper fungicidal protection against the smuts. Foot rot (mal de pied) and related diseases have spread like a prairie

fire until now they cast their sickening blight over the vast wheat fields of the Prairie Provinces and adjoining States. Each summer sees our mid-western "yellow peril," the sow thistle, pushing out into new and fertile fields; each autumn finds the corn borer some 30 miles farther west and south. And why? Why must we, year after year, pay such an enormous toll to these unwelcome guests?

Surely we know better than to drill wheat or other grain into an unplowed corn field. It is now fairly common knowledge to many of our farmers that there is a cereal disease called scab and that this disease is sometimes very destructive, especially of wheat and barley. It is quite generally known that the scab organism, *Gibberella saubinetii,* is parasitic on corn and that it readily discharges its spores into the air at a time when the near-by wheat or other cereal may be most subject to scab infection. And yet, were you to journey by rail or motor car through the Corn Belt in September or October you would be amazed at the vast amount of wheat being drilled into corn land studded with the standing remnants of the summer's crop. Why, regardless of our knowledge of the fact that scab can be controlled by plowing under all crop refuse, do we continue a slovenly, unscientific practice? True, serious outbreaks of scab are infrequent. Seldom are they of more than local distribution and importance. But why should we continue our tolerance of a controllable disease that not only ruins millions of bushels of grain but threatens even to embarrass us in foreign markets? Why should we longer put up with any preventable plant disease, recurrent epidemics of which make farming less profitable and hence less attractive than it should be?

Seed treatment for the prevention of bunt, by one method or another, has been practiced nearly 300 years. Methods for its easy and almost complete control have been known and practiced in North America for many generations. Yet, even now, in spite of our modern means of getting the results of scientific research out to the remotest farm, in spite of our highly developed and efficient extension service and improved and easily operated seed-treatment apparatus, we, in the United States, pay out annually to the ravages of this preventable pest a toll of millions of bushels. In 1927, bunt destroyed in the United States nearly 29,000,000 bushels of wheat.

The smuts of oats are equally susceptible to successful control. Yet, not a year passes that does not record the destruction of millions of bushels of otherwise sound, saleable oats. Crop losses of the individual grower, amounting to 25 to 50 per cent, fail too often to shake him out of his habitual *laissez-faire* attitude. He would rather take the loss than bother with seed treatment, even though the little extra labor were to increase his revenue. It still is too often, too generally, a case of perpetuated exploitation rather than husbandry.

Second to no cereal disease in economic importance and in its insidious westward march through the great wheat areas of Canada and the United States is that complex of diseases popularly known as foot rot. Especially important is the Helminthosporium foot rot. We have long known of its presence in the Dakotas and Minnesota. Dean Bolley of North Dakota emphasized its importance in an address gives before the American Phytopath-

ological Society in 1910, on the occasion of its annual meeting in Minneapolis. In 1912 and 1913, he (*1, 2*) indicated the destructiveness of root and foot rots in North Dakota and pointed out that these diseases were primarily due to certain soil-infesting fungi, notably species of Helminthosporium, Fusarium, Alternaria, and Colletotrichum. He stated that the prevalent practice of growing wheat year after year and continuously on the same soil had been an important factor in promoting the ravages of these destructive fungi. Other important papers on the root rots and foot rots of cereals, and especially of wheat, are those of Christensen (*3*) in 1922, Henry (*5*), 1924, McKinney (*8*), 1925, Greaney and Bailey (*4*), 1927, and Henry (*6*) again, in 1928.

The 1927 data on cereal-crop losses caused by fungous and bacterial diseases, compiled by the United States Department of Agriculture, do not specify losses caused by the foot and root rots of small grains. For wheat alone, the toll paid to all diseases on which data were recorded was estimated to be 117,845,000 bushels or about 7,000,000 less than the entire wheat crop produced in North Dakota last year. After deducting from this loss, that caused by the smuts, rusts, scab, and black chaff, we have a balance of 12,277,000 bushels due to other diseases, chief among which were foot and root rots. It is my belief, founded on detailed and extensive inspection of many fields in Minnesota and the Dakotas, that the 1927 loss caused exclusively by the Helminthosporium foot rot of wheat was considerably more than 12,000,000 bushels.

In 1928, this foot rot apparently was much more widespread and destructive. Not only did it invade the wheat fields of Minnesota and the Dakotas, but it created havoc in a vast amount of wheat in Montana. Careful inspection of 179 fields aggregating nearly 20,000 acres in nine counties of that State showed foot rot in all but one field. There was an average prevalence of 48.7 per cent and an estimated average loss of 11.8 per cent. In the Judith Basin, we observed a combine cutting and threshing a field of winter wheat. This field, like so many of those sown in late July and August, 1927, had been all but blasted by Helminthosporium foot rot. It was yielding but 9 bushels per acre of inferior wheat, where, in any average, favorable year, it would have given a return of 25 to 30 bushels of excellent wheat. In the Dakotas we observed entire fields affected by this disease. Many were not worth harvesting. Inspection of wheat fields in eight counties of northeastern South Dakota showed an average loss of 80 per cent on 20 farms. Scarcely a field could be found free from the disease. In Colorado, Greeley County alone suffered a foot-rot loss of approximately 175,000 bushels or 11.6 per cent of the county's entire wheat crop.

It seems probable that some of the loss caused by foot rots has been charged to other and better-known diseases.

A vast amount has been said and volumes have been written about stem rust of wheat and other cereals. Time and time again our attention has been called to the fact that unless we find some effective means of controlling this most destructive demon of all our cereal diseases the culture of spring wheat in Minnesota and the Dakotas is doomed. So deeply ingrained is this fear of stem rust in the thought and mental habit of many growers that they

are inclined to attribute to rust the damage caused by other diseases. They realize that something is seriously the matter with the crop and, having heard and experienced so much at the hands of this dreaded pest, they assume it safe to blame rust for almost everything that happens to their wheat crop. But let it be said here that unless some radical changes in agronomic practice are adopted by our spring-wheat growers, if disease-resistant varieties of wheat are not developed and adopted, the foot and root rots of wheat seem sure to make the continued culture of this crop so unprofitable as to result in its abandonment in the most seriously infested areas. Its presence in our midst, in my judgment, is the most ominous condition now facing the wheat grower of our great western prairies.

Leaf rust of wheat, like the poor, we always have with us. Sometimes, as in 1927, it is widely distributed and destructive. Because only in rare instances does it shrivel the grain and render it virtually worthless for the manufacture of high-grade flour, it has been rated as of minor economic importance. We now know, however, through research carried on by Mains (*7*) that leaf rust of wheat may reduce the yield from 11 to 97 per cent, depending on the duration and severity of the epiphytotic and the stage of development of the host when infection becomes an accomplished fact.

Unquestionably, leaf rust has been an important limiting factor in the wheat production of the Eastern States. We know that to the farmers of Ohio, Illinois, Indiana, and Michigan it is considerably more important than stem rust. In years of destructive leaf-rust outbreaks, such as 1923, it may totally ruin entire fields. Yet, through seed treatment for prevention of smuts and through improved agronomic practice winter wheat still is a profitable crop in those States in spite of leaf rust. The eventual adoption of varieties of established resistance to leaf rust and scab and the further improvement of agronomic practices will make it yet more profitable. Notwithstanding the fact that Ohio, Indiana, Illinois, and Michigan are, almost every year, subject to leaf-rust epiphytotics the four States together, in 1926, produced 133,464,000 bushels of wheat. In 1886, 40 years earlier, their combined production was 134,749,000 bushels. To be sure, with the increase in population, the per-capita production has decreased during those 40 years. Other crops, notably corn and oats, have crowded out some of the wheat. The dairy and live-stock industries have developed apace; yet wheat still continues to be profitably grown in the rotation. Wherever true husbandry rather than exploitation prevails in the wheat belt, there you will find wheat a paying crop.

Of all the pests that rock the boat of the spring-wheat farmer and throw the spirit of panic into the market place, there is none more dreaded, none more baneful, than black stem rust. Probably no one cereal disease has so influenced changes in crop practice as has this one. It doubtless has been blamed for a vast amount of damage not truly chargeable to it, however culpable it may have been through all the centuries of its unrelenting curse. Volumes have been written chronicling its devastations. Millions have been spent in man's effort to throttle it. It goes merrily on, producing new physiologic forms to attack and destroy our latest and most promising hybrid selections of wheat and oats. It thrives amain on the common bar-

berry and, on the back of this host from the Asiatic highlands, it has ridden into our midst. It spreads on the wings of the west wind and the east wind, and the south breezes bring it from the Mexican border. It sits at our table. It steals from our bank account. But, in the end, it may prove a blessing in disguise, for already it has forced us to eradicate the common barberry. It has had some part in compelling us to diversify our agriculture more than we otherwise would have done. It has been a potent factor in stimulating research in agronomy and in cereal pathology.

An examination of crop-production data as recorded in the annual reports of the United States Patent Office and, later, those of the United States Department of Agriculture, discloses little or no specific information on the occurrence of stem rust in the mid-western States until about 1893. The scattered and occasional reported damage from "rust" gives us scant clue to which rust was involved or whether both rusts were present. And yet when we read of the enactment of laws against the common barberry in certain of the New England Colonies as long ago as 1726 and 1755, because of its "baneful influence on all sorts of English grain," we realize that stem rust must have been a common and recurrent pest. Indeed, so destructive was it in the coast counties of New England that wheat culture in those counties finally was permanently abandoned.

The barberry, perfectly happy and at home on the hilly farms and in the stone hedges of Massachusetts and Connecticut, soon escaped from cultivation and has long since spread to the interior of much of New England. And, partly because of this bush and partly due to other factors, those States have become famous for other products than those of their fields of waving grain. It would be a mistake, however, to state unqualifiedly that stem rust alone was the cause of New England's abandonment of wheat culture.

Referring again to the annual reports of the United States Patent Office, we find the following statements relative to wheat culture in New England during the decennium 1852 to 1861: "The wheat crop is annually increasing and was, in 1850, 1,090,894 bushels. ..... The crop was, a few years ago, neglected and nearly ran out. Two or three unfavorable seasons, and the continued devastations by insects, discouraged the farmers from continuing; but it has most successfully revived. During the present season, (1861), 40 and 50 bushels (per) acre have been frequently raised in Massachusetts. A like yield obtained in the Valley of the Connecticut, in the States of New Hampshire and Vermont." In the Annual Report of the Patent Office for 1862 we find the following under "Wheat-Growing in New Hampshire:" "The census returns of 1850 put down the number of bushels of wheat in the State at 185,658; that of 1860, at 238,966." Year after year, until 1892, the New England States produced annual wheat harvests of more than a million bushels of grain of good to excellent quality, and with acre yields often running from 3 to 5 bushels higher than those of the area comprising the States of Ohio, Indiana, Illinois, Michigan, Wisconsin, and Iowa.

The facts presented in the foregoing reference to wheat in New England, down to within fairly recent times fail to convince us that stem rust or any other wheat pest was solely responsible for the sudden and general change in crop practice that occurred there in the early nineties. This is all

the more remarkable when we recall that the major part of New England's wheat acreage was devoted to spring wheat. No doubt several factors, economic as well as biologic, contributed to the abrupt decline in her wheat culture. Already, the dairy industry had become well established. Tobacco and truck crops had largely replaced wheat in the lower Connecticut Valley. The influx of Europeans accustomed to growing other crops than wheat and the increase in the crop of week-end boarders from near-by cities—all these factors, combined with the opening of our vast prairies in the seventies and eighties and the serious agricultural depression which befell the United States in the early nineties, effectively silenced the sound of the drill and the harvest drone of the binder throughout New England's hills.

We have heard not a little to the effect that stem rust has been responsible in Minnesota for much of the abandonment to other crops of 4½ million acres formerly devoted to wheat. In 1901, Minnesota's wheat acreage reached the enormous figure of 6,209,506 acres. By 1916, the year of the great stem-rust epidemic, her acreage had declined to 3,465,000 acres. In 1917, her farmers sowed 2,947,000 acres and in 1918, 3,799,000 acres. The stimulus for increased production incident to the World War ran the acreage up to nearly 4,000,000 acres in 1919 but by 1924 it had dropped to 1,716,000 acres.

Now, there is no denying the fact that stem rust was an important factor in turning this vast area of 4½ million acres away from wheat to other crops and to forage for dairy cattle and other live stock. But to state that this rust or any one plant pest was principally responsible is to make an unprovable assertion. I do not for a moment doubt the fact that stem rust discouraged the Minnesota wheat farmer. So did chinch bugs and leaf rust. So did drought and hot, withering winds. And when the money value placed on Minnesota farm lands nearly doubled in the second decade of this century and farm wages increased, with wheat selling for less than a dollar per bushel until 1916,—when these conditions, plus the ever-increasing cost of operating and equipping his farm and menage came upon him, he quite naturally did one of two things: either he gathered up his family and tools for a flight to a new venture in Saskatchewan or Alberta or he changed his farm practice. Much—very much—of both was done. Minnesota, once world-renowned for her enormous output of superb spring wheat, still harvests her millions of bushels, still ranks high as a producer of small grains. But, as the years pass she is more and more becoming known for her dairy products, her potatoes, her corn, and her better, more scientific agriculture.

And what shall we say for the Dakotas? Probably no part of the United States, certainly no part of the spring-wheat area, has felt more forcibly or more frequently the blighting visitations of stem rust. In no part of the Middle West is the influence of the rusts and smuts and foot rots more profoundly felt, more visibly manifest, than in the Dakotas, and in South Dakota especially. Wheat culture has been all but abandoned in entire counties of eastern South Dakota. With the passing of wheat, corn has come into the picture to such an extent that South Dakota to-day takes her place among the Corn-Belt States. In 1891, her farmers planted 934,000 acres of corn. In 1927, 36 years later, this crop

occupied 4,655,000 acres, or 5 times as much. Oats, in 1891, claimed an area of 724,000 acres. In 1927, this cereal was sown on approximately 2,480,000 acres. Her wheat area, in 1891, was nearly two million acres, while that of 1927 is estimated to have been 3,092,000 acres, 32 per cent of which was devoted to durum varieties. South Dakota's maximum wheat acreage (4,004,830 acres) was harvested in 1901 and from then on down to 1920, excepting in the three years, 1900, 1907, and 1908, she harvested every summer more than three million acres. Even the catastrophe of 1916 caused only an inconsequential abandonment of wheat acreage in 1917, when, in addition to 2,127,000 acres of common wheat, her farmers harvested 573,000 acres of durum sorts. Because of their relatively high resistance to both stem rust and leaf rust the durum varieties acquired increasing popularity in South Dakota until 1923. Since then the durum acreage has fallen for reasons not yet wholly clear. It is a fact, however, that the varieties Acme and Pentad comprised much of that acreage. These two varieties were so unpopular from the standpoint of the buyer that the growers were obliged to bear considerable dockage. Then, too, more and more of South Dakota's land was being planted to corn and forage crops. Durum wheats are an easy prey to root and foot rots and especially to the Helminthosporium foot rot. No doubt all these and other factors, combined, brought about the decline.

In South Dakota, therefore, and to a less extent, but none the less certainly, in North Dakota, the cereal-pest factor has been an important contributor to the changes yearly being wrought into the crop map of the Dakotas. Economic factors, social factors, weather, and research in agriculture, all these and more, are by virtue of economic determinism forcing our midwestern farmer either to change his crop practice or move on to the uncharted virgin expanse beyond his latest conquest, in search of new adventure.

And now, in conclusion, is it too much to hope that in the years to come there will arise out of our struggle against all the pests that prey on our crops, against the spirit of loot and adventure, against the economic evils that beset us, a saner, more scientific agriculture? Is it too much to hope that out of it all we may gain a different, a more wholesome attitude toward the farm and toward life on the farm? Let us hope and pray that eventually we shall not grow less wheat but better wheat, better corn, better fruit, better live stock. Eventually, perhaps, life on the farm may become an expression of the fine art of living the constructive life of love expressed in the beautiful thought of Ajutor Rivard. In "Chez Nous," he, in writing of his farm, said: "They (my ancestors) thought of everything. That elm was spared to give my cattle a little shade on a hot day. Everywhere I see their handiwork. Each one of them left his mark and the labor of their stout arms lightens mine. I spade the earth more easily to-day because one by one they turned it. The sweat that ran from their foreheads helps to grow the wheat whereof is made my daily bread. Something of themselves lingers in every sod cast up by my plowshare. Well, that is what our country is and I should like to see the American who would come and take my land from me."

Eventually our western farmer may be able to say with Liberty Hyde Bailey in "The Harvest": "Every day this week I have worked in the fields.

The odor of the freshly turned furrow has again become part and parcel of my blood and sinew. .... Its urge challenges my best effort. He who does not know this springtime fragrance of the soil with its promises of fruition does not fully know the joy of farming. To plant seed in well-prepared soil and by careful culture develop useful plants; to make of the wobbly colt or calf or pig an animal better than its sire,—What could be greater?"

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NINTH ANNUAL CONVENTION, CANADIAN SOCIETY OF TECHNICAL AGRICULTURISTS
Manitoba Agricultural College, Winnipeg, June 12-15, 1929.

NINTH ANNUAL CONVENTION, C.S.T.A.

When the recent convention of the Canadian Society of Technical Agriculturists came to a close on June 15th, and the new Board of Directors met to consider plans and policies for the coming year, it was commonly agreed that a new interest and enthusiasm had been evident throughout the meetings. This was, of course, partly due to the fact that the sessions were held at the Manitoba Agricultural College, where an atmosphere of quiet industry and friendly social intercourse prevailed, but it was mainly due to the excellence of the addresses and reports presented at the meetings, and to keen, thought-provoking discussions.

Tribute should be paid at once to the various committees that had charge of local arrangements. Such important details as reception, registration, entertainment and publicity were in capable and efficient hands, and those who arrived at the College were soon made to feel that this was to be their home for several days, that facilities for various forms of recreation were at their disposal, and that many courtesies not usually extended on such occasions were being given at all times. The convention paper, "The Bison's Bellow," appeared promptly every morning, having been produced during the night by Messrs. Batho and Chapman.

The fact that the annual meeting of the Western Canada Society of Animal Production and of three groups within the C.S.T.A.—Horticulture, Economics and Agronomy—were all held concurrently during the main convention, did much to add diversity to the programme. These group meetings were all very successful and will probably be extended in future years.

The annual meeting of the Canadian Seed Growers' Association immediately preceded the C.S.T.A. convention, and many of its members remained at the College for the balance of the week.

The total registration for the C.S.T.A. meetings was about 175, which is the largest attendance at any western convention.

Left to right: Dr. E. S. Archibald, President, 1928-29; Prof. J. P. Sackville, President, 1929-30; Mr. Fred H. Grindley, General Secretary.

The visit of Dr. F. A. E. Crew of the University of Edinburgh, and of four lecturers from the United States—Dr. M. J. Dorsey of Urbana, Ill. (Horticulture), Dr. W. E. Grimes of Manhattan, Kansas (Agricultural Economics), Dr. H. B. Humphrey of Washington, D.C. (Plant Pathology) and Dr. W. L. Williams of Ithaca, N.Y. (Animal Pathology)—was the outstanding feature of the convention. Each of the lecturers from the United States addressed one open meeting and one group meeting; Dr. Crew gave one open address and two addresses to the Western Canada Society of Animal Production.

The entertainment features were the T. Eaton Company banquet on June 12th, the motor trip to the Dominion Experimental Station at Morden, Man., on June 13th, the Provincial Government Banquet on June 14th and the luncheon by the Manitoba branch of the C.S.T.A. on June 15th.

In the July issue of this journal, on pages 760-762, some of the most important items of business transacted were announced. In the following pages the reports of standing committees and of special convention committees are given in the order in which they were presented. The Presidential address of Dr. E. S. Archibald and the annual report of the General Secretary are published in full, as well as the open lectures of Dr. F. A. E. Crew, Dr. W. E. Grimes and Dr. H. B. Humphrey. Other lectures will appear in later issues.

LECTURERS AT THE CONVENTION

Left to right: Dr. W. E. Grimes, Dr. M. J. Dorsey, Dr. W. L. Williams, Dr. F. A. E. Crew, Dr. H. B. Humphrey.

PRESIDENTIAL ADDRESS

Presented at the Ninth Annual Convention of the C.S.T.A.

E. S. Archibald

Central Experimental Farm, Ottawa, Ont.

At the outset I wish again to express my gratitude for the Presidential honour which was conferred upon me. My associations in that capacity during the past year have been a source of the very greatest personal pleasure and I shall always cherish the many new friendships which I have made amongst the technical agriculturists as a result thereof.

For many years in my work with the Federal Department of Agriculture it has been my privilege to work at various points all over Canada at frequent and regular intervals and during these years I have come in contact with a large number of agricultural workers of other Departments and institutions. The past year has afforded me the special privilege, while travelling over Canada, of visiting most of the C.S.T.A. local branches, and I wish to express my thanks to the members of the Dominion executive and the officers and members of each Local for their hospitality and inspiration. Certainly my last year of travelling in Canada has been by far the most enjoyable and profitable to date.

Past presidents in their addresses have without exception given us some very sound thoughts and advice. They have told us of the tendency amongst scientific and technical men in agriculture toward an inferiority complex and have urged us to realize and cultivate a true professional spirit and pride. Nothing will dispel the former and increase the latter to a greater degree than the upbuilding of our Society. As each member contributes to its progress and work, in like measure he will benefit in his professional esteem.

Knowing Canadian agriculture and her technical workers as I do, it is beyond my comprehension why any man should apologize for an affiliation with agriculture. It is unnecessary in this audience to emphasize the importance of this industry to Canada for we all realize that it is her greatest individual industry, employing half of her population and at the same time providing food and clothing for the balance. It is an industry which provides materials for more than one half of urban manufacture and trade, more than one half of the transportation of her great railways and water transports, and constitutes one third of the gross export trade; hence agriculture is a most significant factor in Canada's commercial prosperity.

Complicated as agriculture is by problems surrounding plant and animal life in our uncertain and severe Northern climate, agricultural problems urgently demand men of the greatest scientific training and ability. The best material in Canada must be attracted into and retained in the technical service of agricultural departments and institutions. Now we fully realize that many lines of agricultural scientific and technical work have no counterpart in private or commercial life, hence this specialization of workers naturally limits their financial freedom and often, unfortunately, their earning power.

These are but a few of the thoughts which inspire my greatest pride in being a member of Canada's group of agricultural scientists. More each year I appreciate my association with such men and the institutions they represent, and even more so because of the increasingly high percentage of our members who annually turn their backs on greater financial inducements from institutions in the United States and other countries in order to remain and serve Canada's agriculture, thus insuring her future prosperity.

The application of science to industry, including agriculture, is now freely accepted, hence in but a short time technical men in agriculture are thus assured of a recognition as to their importance and worth to Canada's progress.

The Year 1928-29

From my own personal knowledge of the work of the Society since its inception, I believe that the past year has been by far the most successful in our history. I am happy in knowing that the same opinion is shared by our General Secretary, by members of the Board of Directors, standing committees, and Locals. I wish especially to voice my appreciation of the marked activity of the various Locals. When I realize what an ambitious and courageous experiment this Society is, it seems remarkable that there is so little inertia or retrogression in our various groups, committees, and Locals. I do believe that many such Locals and committees are still groping a bit and have not yet found their greater fields for activity; nevertheless in taking stock, we have grounds for the greatest gratification and should be inspired to still better activity and organization.

One of the outstanding features of our Society at the present time is our journal *Scientific Agriculture*. Thanks to the courage of past presidents and executives and to the generosity of Government Departments, Universities, and the National Research Council, who have assisted with grants, we have been able to make still greater improvements. To the Managing Editor, who is our General Secreatry, we must give the greatest credit, not only for his editorial ability but also for his ability to interest commercial companies to use the journal for advertising purposes, thus making its present status possible. But finances and advertising alone do not constitute a scientific journal and were it not for the fine support of the members and the contributions of papers of a very high scientific order, the journal would still be lacking. As it now stands, however, we have a journal for scientific agriculture the equal of the best in any country, and we must appreciate that it has played a big part in placing this Society and scientific agricultural research on a distinctly higher level both in Canada and other countries.

I referred to the General Secretary. Without any thought of flattery, I cannot refrain from expressing my appreciation of the privilege to practically live C.S.T.A. with the General Secretary during the past year to a degree which I doubt any past president has done. My association with the General Secretary has been an inspiration and I feel that the credit for our material progress and our excellent financial standing is almost entirely due to him.

The recognition of the growing importance and potentialities of the C.S.T.A. by our great industrial concerns should be a source of further

courage to us in our work. That eight leading agricultural industrial companies have contributed toward the excellent headquarters of the Society and have guaranteed these free of cost to the members for a period of five years, shows their faith in scientific agriculture, their faith in the C.S.T.A., and their recognition of the need for such a body.

The generosity of the T. Eaton Company in contributing agricultural scholarships for the advancement of our agricultural research is an indication of the confidence of that company in the science men in agriculture. The fact that this company uses the C.S.T.A. as an unbiased channel for distribution of these scholarships but points to the unlimited opportunities for service possible to the C.S.T.A. which would be impossible to a university or other institution. If busy industrial companies can see the importance of our Society, one is forced to ask the question why apparently many of our members lack this vision and fail to do their part in promoting the Society's growth and usefulness.

The ideals of our Society set up as initial objectives showed real vision. I believe that progress toward these ideals has been continuous and never greater than during the past year, for during this year the C.S.T.A. has, I believe, been the greatest single factor toward improving relationships amongst agricultural workers, creating a higher standard in our profession, and acting as a medium for progressive ideas. New fields for growth and organization, however, afford every room for unlimited activity. If we remain a virile united body deserving of recognition as an unbiased independent voice, I look forward to the time in the near future when governments, councils, and commissions alike will use this body for special purposes. We must not forget that we, representing all phases of professional agriculture, must not shirk our responsibility and our duty toward all future agricultural policies in all fields of agricultural activity.

The relationship between our Society and the Universities' Conference was briefly discussed at our last convention. The suggestion was made that a representative of this Society meet the Universities' Conference to discuss possible relationships and to suggest fields of activity for the Society. I regret to say that no steps were taken during the year but I trust that action may be taken in this important question in the near future. In like manner, I would urge that a special committee of the executive or of the standing committees on agricultural policies be given the responsibility of a study of the possible place which the Society may fill in serving as needed special commissions, both Federal and Provincial, where scientific agriculture is involved.

Problems as Represented by Our Standing Committees

During the past year I have, through correspondence, through the pages of *Scientific Agriculture*, and in visits to the Locals, made suggestions regarding our standing committees and even with the fear of tiresome repetition, I wish to reëmphasize two or three points.

Every member of this Society must be forced to realize that he has a distinct responsibility in the matter of rural education and agricultural educational policies in Canada. The excellent work of this standing committee has lacked application. To use a golf term, there has been no "follow through". Yet the field for active application and development is unlimited.

If we are to assume our responsibility toward assisting in moulding the educational facilities, environment, and curricula for the next generation of C.S.T.A. members, the application must start in the Locals and culminate in a continued vigorous, active, standing committee on this important subject.

Our committee on Graduate Studies did fine constructive work for a number of years and nothing could be a more fitting culmination of this first stage of service than the excellent survey of agricultural facilities recently completed by Dr. Robert Newton, the report of which we look forward to with much interest. Each member of this Society must realize that although an alumnus of one university, the responsibility is not limited thereto. If perchance Canada has made errors in developing too many colleges, all with the equipment for degree courses, and in excess of the needs of our population, there are equal opportunities for errors in attempts to develop facilities for post graduate studies. Have we not an opportunity to mould public opinion along most economical lines, conducive to most effective results in the development of a few highly specialized, well equipped institutions fitted to give post graduate work, each in a specialty, adequate to meet the needs of Canada and comparable with the best institutions in the world? To me it is obvious that our opportunity is great.

Although but a small percentage of our membership is engaged in agricultural research, yet without exception all members must be interested in the development thereof. There must be no breach in our membership between the research workers and the larger body engaged essentially in educational, extension or commercial activity. During recent years, some misguided men have come to believe that science in agriculture is confined to the four walls of a laboratory and its test tubes. Now no one appreciates more than I the fact that the research laboratory is a most important counterpart to the field work of agricultural research, but I would deplore any tendency toward discrediting or ignoring field research. In the final analysis, the most important and significant research, and above all the proving of findings, must be done in the plots, the fields, or with the animals, as the case may be. It is true that the scientific qualifications for workers in all fields must be of an equally high standard. This standing committee on agricultural research has a field for work as yet unrealized, and I would strongly urge that the committee be stimulated, remodelled, and assisted toward a fuller realization of its sphere of work.

I have on numerous occasions mentioned the necessity for a scholarship committee. I will not repeat my former suggestions other than to say that a vigorous committee represented in each Local may easily be responsible for scholarships not only for post graduate work but even more for high schools or the under-graduate courses, in order that a greater number of our finest brains may be induced and assisted toward following those sciences which are so essential to agricultural development. Realizing the significance of scholarships and bursaries toward the training of men and the upbuilding of the institutions, the National Research Council, some years ago, inaugurated a vigorous programme which is well known by all. The wisdom of granting these scholarships and bursaries is not questioned. A careful review, however, of those who have participated and the lines of science in which they

are working, points to the significant fact that but an exceedingly small percentage of these scholarships have gone to agricultural workers or to the sciences upon which agricultural development so largely depends. Quite recently it was my privilege to have a most interesting discussion of this matter with the President of the Research Council, Dr. H. M. Tory, and I am delighted to state that he is most sympathetic toward making a greater number of scholarships available for agricultural sciences. Equally he is most sympathetic toward widening the field of award in order to include therein so many men in our institutions who are outstanding in their work, have years of scientific experience and training and whose work further training would greatly benefit, yet who are excluded because of the fact that they are married men. No definite action has been taken by the Research Council but Dr. Tory's sympathetic attitude is a most encouraging indication.

Our ever-increasing membership is surely a source of great gratification. A full membership is necessary not so much for the finances of the Society as that our activities represent truly the majority of science men in agriculture. Nevertheless we have constantly suffered losses by resignation. We have failed to draw into our membership a large number of qualified men who are equally interested in agriculture. In other words, to a degree, we have failed, and are failing. Only through a full realization as to the cause of our failure and rectifying that cause may we hope to make continued progress. I believe the Directors should know the cause of each resignation and the reason why others have not joined. They should know in what way members lose faith in the Society, or in what manner the Society is not serving them in their work or in the sphere of activity in which they are engaged. I repeat that there is need for systematic activity in the study of membership which cannot be left to the General Secretary or the Secretaries of the Locals.

An active general membership committee of this Society with a representative from each Local who in turn forms the nucleus of an active Local membership committee would, I believe, be of tremendous assistance not only to increase our membership but even more to stimulate activities in the Locals and to guide our policies.

It is with gratification that this year we see the formation of a new group, namely that of agricultural economics, and I wish to express my admiration and appreciation of the years of work inaugurated by the committee on Marketing which have been responsible therefor. We frankly must admit that agriculture is at low ebb compared with other industries and professions. This condition prevails throughout the whole civilized world, in fact is probably less acute in Canada than elsewhere. This new group affords a new outlet for activity of a most constructive nature by a large percentage of our membership who are essentially engaged in extension work of a semi-commercial nature. I most sincerely trust that in each Local there may be a strong active committee, a counterpart of our new group. I expect the new group to evolve lines of coöperative projects with our standing committees. I can visualize many such possible channels.

For example, our larger city industries are gradually realizing the value of men trained in the science of agriculture who with proper business ability

can be of distinct value to them in the development of their business with rural Canada. I think this is a fine move in the right direction and one which is worthy of special study and consideration by the Economics Departments of our Agricultural Colleges and Universities. Such a move, if developed, might eventually bridge the gap which now exists between agriculture and urban life and industry. Although our rural population has contributed such a high percentage of successful business and professional men to the cities, yet these men, as a rule, have not assisted in bridging that gap, but rather the contrary. In my experience, many of the city men most difficult to convince as to modern agricultural science and development are those who invariably say "I have been raised on a farm, hence I know agriculture".

Finally, I wish to repeat that our standing committees and groups, so important in the concentrated study of major problems of scientific agriculture, must have an active counterpart and a distinct linkage with all Locals.

Locals

I wish particularly to compliment the Locals on their increased activity and improved organization during the past year. As I see it, activity in the Locals is the very life blood of this Society. It is the only guarantee of a future of growth and ever-increasing usefulness. Until every individual and Local appreciates the problems and difficulties in agricultural development and the necessity for organized effort ,this Society cannot have the most active and effective machinery for work. It surely is the duty of every Local systematically to study and assist in the work of each standing committee. This should not be spasmodic but a distinct duty of the Local, for as our agriculture is changing because of economic conditions or changes due to science, so does the application of the work of a standing committee change toward the Local problems.

In like manner, I believe that the main-spring of vigorous groups or affiliated societies rests in the activities within the Locals. The Local should rightly give the lead to this Society in matters of organization and policy. Then only will the annual meetings represent the voice of the full membership of eleven hundred or fifteen hundred members.

Good annual conventions such has we have always had are a source of inspiration to all who attend and thus indirectly to our full membership. Such meetings rightly should be a culmination of a year of hard work of the full membership, and if such, then business can be quickly done, and new policies surely and effectively moulded.

I trust it may be my privilege as a member of this Society to attend many more annual conventions, to take an active part in the business and organization, and to enjoy attending the conventions of scientific workers in their various groups at such times.

REPORT OF THE GENERAL SECRETARY

Presented at the Ninth Annual Convention, C.S.T.A., Winnipeg, Man., June 13, 1929.

FRED. H. GRINDLEY

I take pleasure in presenting my ninth annual report as General Secretary of your Society. In many respects it is more encouraging than any previous report, showing satisfactory growth in membership, further improvement in our journal and the maintenance of a reasonably safe financial balance. I do not propose to do more than follow the usual form adopted in my previous reports and to present the details of our operations and activities during the past twelve months.

MEMBERSHIP

On June 1, 1928, the total membership of the Society, reported at the Quebec convention, was 1,023, made up of 989 regular members and 34 student members. Since that time it has been necessary to remove the names of 57 regular members for non-payment of fees or because of resignations. During the same period 122 regular members have been admitted.

I regret to report the loss of six members through death: George H. Hutton on June 7, 1928, Charles W. Baxter on June 9, 1928, John P. Spittall on July 9, 1928, Gordon S. Matthews on December 5, 1928, J. Bernard Hoodless on April 15, 1929 and George C. Creelman on April 18, 1929. The last named was a past President and Fellow of the Society.

The present number of regular members is therefore 1048. Four of these—E. K. Hampson, H. E. Lefèvre, J. E. McIntyre and Lucien Therrien—have taken out life membership during the year, bringing the total number of life members to seven. The number of student members this year is 36 as compared with 34 last year.

The total membership on June 1, 1929 was 1,084 as compared with 1,023 on the same date in 1928. Ninety-four per cent of the members were fully paid up on May 31, 1929.

The foregoing information is condensed in the following table:—

1928 Membership:		
Regular members	989	
Student members	34	1,023
Taken off:		
Students	34	
Resignations	57	
Deaths	6	
Total loss		97
Balance		926
New members:		
Regular members	122	
Student members	36	158
Total present membership		1,084

A net increase of 61 members during the year is very satisfactory, especially when we remember that the Society is now entering upon its tenth year, and is almost entirely dependent upon recent graduates for membership increase. A fairly carefully organized membership campaign was conducted in the fall of 1928.

There have been noticeable increases in membership in British Columbia, Western Ontario, Northern Quebec, Macdonald and North Saskatchewan.

"Who's Who"

Between February 12th, 1929 and the end of the Society year, a great deal of time was spent on the preparation of a new edition of the C.S.T.A. "Who's Who," which has recently been mailed to all members who ordered copies of it. The volume should constitute a useful reference book, and probably will be revised at the end of another five years, and a third edition published.

"Scientific Agriculture"

Further improvement was made in the Society's journal by adopting a better quality of paper with the commencement of Volume IX in September, 1928, and increasing the number of pages in the volume by about 24. The journal has continued to receive financial assistance from several sources, which are named on the front cover of each issue, and the maintenance of the journal in its present form depends very largely upon these various grants. The Society, of course, applies a large part of its advertising revenue to the expenses of publication.

During the past year there has been a noticeable increase in the number of manuscripts received. No longer is it possible to guarantee publication with the same promptness as formerly; a delay of almost six months may soon be necessary. This is by no means an unusual condition with scientific journals, but those of you who know the history of our own magazine will realize how encouraging it is in our case.

Subscriptions and exchanges are developing, particularly in foreign countries, and scientific magazines by the score are now being received at the central office from almost every country and in almost every language, in exchange for *Scientific Agriculture*.

Our official journal is in a very satisfactory position and further developments are quite possible.

The T. Eaton Company Scholarships

The five T. Eaton Company scholarships of $600.00 each, awarded at the last convention were all taken up with the exception of one. Mr. J. R. Ferron found it necessary to withdraw his application and this scholarship was subsequently assigned to Mr. Auguste Scott. Four of the five successful 1928 candidates carried out their graduate work at the University of Toronto and one at McGill University.

The scholarships have been donated to the Society again this year and there are fourteen candidates for them. The following committee has been appointed by the Board of Directors to select the five successful candidates: Dr. G. G. Moe, Chairman; Dr. Robert Newton, Dr. P. M. Simmonds, Dr.

J. E. Lattimer, Dr. W. F. Hanna, Dr. A. Savage, Professor A. W. Baker, Mr. F. Pugh, Dr. E. S. Archibald, Mr. F. H. Grindley.

The decision of this committee will be announced on June 15th.*

Survey of Graduate Facilities

As announced at last year's convention, a sum of $4,000 was made available to the Society by the International Education Board for the purpose of making a survey of graduate facilities in agriculture in Canada and of publishing a graduate calendar based upon this survey. Dr. Robert Newton of the University of Alberta has been engaged upon the survey for several months and will submit his report on June 14th. It is expected that the report will subsequently be printed and mailed to all members of the Society and to the graduating classes in agriculture each year.

Chilean Nitrate Grant

A grant of $600.00 from the Chilean Nitrate Committee, to assist in the maintenance of clerical assistance in the central office was received during the past year.

Incorporation

The Society was incorporated under Dominion Charter dated June 9th, 1928.

Text Book Club

The sale of agricultural books to members, through the central office, has constituted quite an important part of the office routine. Sales have approximated $2,000, the largest annual turnover in our history, and members seem to appreciate the service, and the trade discount, very much.

Local Branches

Special mention should be made of the various local branches which, in most cases, have been much more active than usual and have endeavoured to relate part of their activities to those of the parent Society. The President of the Society has been largely responsible, through letters to branch secretaries and personal attendance at branch meetings, for the stimulation of much interest along lines that promise to be productive. The relationship between local branches, standing committees, group organization, etc., all aiming towards the annual convention as a clearing house, are now quite fully appreciated. Without much further organization and pressure, these principles should constitute the basis of new enthusiasm and fresh impetus, not only among locals, but within the parent body as well.

No new local branches have been organized during the year, and the total number remains at seventeen.

Group Organization

Through the initiative of Dr. J. E. Lattimer, an Economics Group has been organized within the Society and this group is holding its first meeting at this convention. The Horticulture Group was organized in 1926.

There is no intention on the part of the Board of Directors to force the organization of these specialized groups, but to assist in their organization where there appears to be a need and where a group of members appears to

*See *Scientific Agriculture*, July issue, 1929, page 761.

be interested. No further group organization is under consideration at the present time.

Travelling

During the year the General Secretary has attended meetings of the following local branches: Quebec, Macdonald, Eastern Ontario, Western Ontario, Niagara Peninsula, Northwestern Ontario, Manitoba, South Saskatchewan and North Saskatchewan. The usual amount of travelling has been necessary in connection with the soliciting of advertisements.

The General Secretary acted as your delegate to the council meetings of the American Association for the Advancement of Science at New York City in December, 1928.

Finances

The financial statement for the past year is in your hands, and should be carefully studied.* A few of the most important features will now be referred to.

The cash balance of $2,015.61 with which we closed our books a year ago, has increased to $2,780.92, and the actual credit balance of $2,780.20 on May 31st, 1928 has increased to $3,482.58 on May 31st, 1929. Thus there was an operating surplus of $702.38 for the year in spite of a natural increase in operating expenses, a higher salary for the General Secretary and the costs of incorporation.

As compared with the report of last year, there have been increases in receipts from subscriptions, from the sale of text books, from advertising, and from grants towards the magazine. In no item has there been any serious decrease in revenue. On the expenditure side there has been a heavy increase in the cost of printing the journal, and slight incrases in the items for cuts, postage, clerical assistance and text books. The only decrease in expenditure was for miscellaneous printing. The increased cost of printing the journal ($5,842.60 as against $4,824.90 last year) was more than balanced by the increase in grants received ($4,050.50 as against $2,657.00 last year). In other items of expenditure there has been no appreciable change.

The report is quite satisfactory and gives reasonable assurance of financial stability. It is again interesting to note that of our total revenue for the year, 22 per cent was contributed by the members and 78 per cent came from other sources.

There is naturally no stability to such sources of revenue as advertising and grants, which constitute 50 per cent of our normal annual income. Continued effort is necessary to keep them up to the required amount, and any serious industrial depression, or falling off in institutional support, would have a serious effect upon our finances.

Establishment of Headquarters

Probably the most important development during the past year has been the establishment of adequate headquarters for the Society at Ottawa, details of which have already been published in the journal.

*Copies of the annual financial statement may be obtained by any member from the General Secretary, on request.

Due to the interest of Mr. Thomas Bradshaw, Vice-President and General Manager of the Massey-Harris Company Limited, a sum of money was raised sufficient to rent and equip suitable executive offices, a lounge room and a board room, all of which were placed at the disposal of the Society on May 1st, 1929, and officially opened on May 10th. The payment of rental charges is assured until May 1st, 1934.

While these headquarters are undoubtedly of greatest benefit to your General Secretary, the gift will be appreciated by every member and will be of direct benefit to those who reside in Ottawa or come to Ottawa occasionally. The lounge room includes facilities for reading, writing and telephoning, as well as informal meetings. The board room, well furnished, will accommodate agricultural committee meetings of various kinds. Board room and lounge room connect by folding doors and have a combined seating capacity of fifty.

The establishment of these headquarters places your Society in an entirely new position, as compared with previous years. Through them, we can do much more efficient work; we can have many meetings held under our auspices; we shall receive increasing recognition.

The firms which contributed to this gift are as follows:—

International Harvester Company, Chicago, Ill.
J. I. Case Threshing Machine Co., Racine, Wis.
Deere & Company, Moline, Ill.
International Milling Company, Minneapolis, Minn.
Western Canada Flour Mills, Toronto, Ont.
Massey-Harris Co., Ltd., Toronto, Ont.
Lake of the Woods Milling Co., Ltd., Montreal, P.Q.
Ogilvie Flour Mills Co., Montreal, P.Q.

No reference to the expenses of our new headquarters appears in the financial statement. A separate rental and equipment account has been opened, and two representatives of the contributing firms have been named to act as advisors to the Society in the administration of this account.

The Ninth Annual Convention

Plans for this convention were initiated by the Manitoba Branch, which appointed a convention committee in the latter part of 1928. This committee met your President and General Secretary in January last. Since that time practically all of the organization work has been done by the committees named in the programme and by the Manitoba Branch Executive.

Grateful acknowledgement is due to the Manitoba Department of Agriculture, the Manitoba Agricultural College, the Dominion Experimental Station at Morden, the T. Eaton Company and the Manitoba local, for complimentary luncheons, banquets, and other forms of hospitality. Special mention should be made of the assistance given by the Dominion Department of Agriculture and the Empire Marketing Board, in making possible the series of lectures included in the programme.

New Officers

Ballots for the annual elections were mailed to all members on April 10th and opened at Ottawa on April 30th. 748 members voted. The fol-

lowing official results were announced through the Canadian press on that date and published in the May issue of *Scientific Agriculture*:—

President—J. P. Sackville.

Vice-Presidents—W. T. Macoun, Georges Bouchard, M.P.

Honorary Secretary—L. H. Newman (re-elected).

Meetings of the Board of Directors were held at Quebec on June 14th, 1928, and at Winnipeg, Man., on June 12th, 1929. A special meeting of the Executive Council was held in Toronto on November 23, 1928.

I regret to report that Professor H. M. Nagant, who has carried out the duties of French Secretary of the Society and French Editor of our journal for the past four years in a very satisfactory manner, has found it necessary to relinquish the position on account of ill health. He has been temporarily succeeded by Mr. J. Damase Belzile, and an appointment for the ensuing year will be made by the Board of Directors.

In closing, I would like to extend my personal acknowledgements to the members of the Board of Directors, the various committees and the local branch secretaries, for the very excellent support and wise counsel which they have given during the year, and also to Miss Helen Henry in our central office who has relieved me of so much routine work.

We enter upon our tenth year with no obstacles confronting us, but with much further development work to be done and new activities to undertake. We can look back upon the past nine years and see steady growth, the consolidation of a large membership body, the establishment of a creditable journal, and a long list of worthy accomplishments. Let us hope that the future of our Society will be equally encouraging and stimulating.

REPORT OF THE C.S.T.A. RESEARCH COMMITTEE

G. P. McRostie, *Chairman*

At the annual meeting of the C.S.T.A. held in Quebec City a year ago the research committee presented a list of the research projects under way in Canada under the auspices of institutions and departments other than the Dominion Experimental Farms Branch. It was pointed out at that time that the list as presented included sins of both omission and commission. The consensus of opinion of the committee was that nothing short of a personal interview with the various agricultural workers would avail in bringing the report up to the desired degree of accuracy required to make it serviceable to agricultural workers. The meeting as a whole concurred in the suggestion that the report as submitted be transferred to Dr. Robert Newton of the University of Alberta with a request that he endeavour to include the verification and correction of the results of the said report in his duties, on the occasion of his visits to the various Provincial and Dominion institutions in search of information regarding facilities for graduate studies. At the first institution visited Dr. Newton attempted to comply with the requests of the annual meeting in this connection. He found however, that the time which would be consumed in securing the necessary information was greater than he had at his disposal, consequently further work with the list of projects had to be dropped. The list in question therefore

remains at the present time in much the same condition as when presented a year ago.

As you are doubtless aware the Imperial Research Conference has been instrumental in the organization of research bureaus concerned with different phases of agriculture. One of the functions of these bureaus is the collection and dissemination of information regarding the agricultural projects under way throughout the whole British Empire. Obviously the value of these empire research bureaus will depend on the accuracy of the information furnished to them, and also on such information being kept up to date. The list of projects under discussion would constitute at least a portion of Canada's contribution to the central bureaus. It is therefore obviously essential that these lists be completed and made as accurate as possible in the near future. Provision for this is being suggested in a later section of this report.

During the past year the chairman of the research committee has written to every C.S.T.A. local in Canada requesting information as to what the local considered to be the most important agricultural problems of the location in question. At the same time suggestions were invited as to the manner in which the research committee might aid in furthering the research of each locality and of Canada as a whole. The various members of the research committee were also corresponded with, with somewhat similar requests as to the possible functions of the committee under discussion.

The replies from the locals in the matter of suggestions was somewhat disappointing. However, the correspondence as a whole has contained some very helpful suggestions as to what might constitute a definite policy for the research committee of our Society. The following suggestions are offered for your discussion as indicating the trend of opinion of both the committee members and the locals scattered throughout Canada:

1. It is suggested that the research committee of the C.S.T.A. assist in collecting and keeping up to date research problems, in any way affecting agriculture, being conducted in the Dominion, and that this information be furnished, through the proper channels, to the Imperial Bureaus recently organized. The research committee would therefore assist in ensuring the completeness and accuracy of Canadian agricultural projects listed by the Imperial bureaus. For this reason it is suggested that the Research Committee be represented by a member from each Department or Institution in Canada conducting agricultural projects. It is suggested also that the representative from the various institutions become responsible for the continued completeness and accuracy of the projects listed by the Department or Institution which he represents.

2. It has been suggested that the Research Committee might assist in the promoting of research scholarships. In this connection the necessity is pointed out of developing research workers particularly among the younger graduates of our various institutions. Scholarships appear to be a satisfactory means of enabling graduate students to enter the field of research under the guidance of trained workers, and aid in the solving of Canadian agricultural problems.

3. It has been suggested that the Research Committee might aid in establishing a more definite coöperative basis of research among agricultural

workers. Many problems are far-reaching in their ramifications with a corresponding difficulty of any one worker being able to investigate the problem from all standpoints. Instead of a more or less "hands off my problem" attitude it has been suggested that the probable sacrifice of a small amount of personal prestige would permit several workers to attack, simultaneously, correlated phases of some of our large problems and be productive of worth while results.

4. It is suggested that the Research Committee after studying the projects under way in Canada and the intimations with regard to needed investigations, should make suggestions as to problems which in their opinion might be profitably carried out in different parts of the country. This suggestion has particular reference to the matter of problems for a scholarship, but need not end there.

5. It is suggested that the Research Committee should give more publicity to the matter of agricultural research in Canada, and keep before the Dominion and Provincial Departments and National Research Council and private individuals the necessity for financial assistance in the carrying out of a national research programme.

In addition to the above suggestions, lists of projects requiring investigation have been presented by several of the locals. These lists are all on file with the secretary of the association.

It is hoped with the present suggestions as a basis for discussion that a definite policy will be outlined by this annual meeting for the future activities of the Research Committee. Unless some definite policy is brought into effect by the Convention, the committee must of necessity work in a more or less haphazard way, and without the possibility of functioning to the greatest benefit of agriculture as a whole.

REPORT OF C.S.T.A. COMMITTEE ON MARKETING EDUCATION

F. M. Clement, *Chairman*

Four reports have been made to date by the Committee on Marketing Education. The fourth report appears on Page 39, Volume IX, No. 1 of *Scientific Agriculture*. The first paragraph of this report makes reference to the previous reports and, consequently, what has previously been done need not be elaborated here. The Committee for this year consists of F. M. Clement (Chairman), D. A. MacGibbon, A. M. Shaw, H. C. Grant, W. H. J. Tisdale, Joseph Coke, P. A. Fisher, H. S. Arkell, J. E. Lattimer, J. B. Cloutier, W. V. Longley, J. A. Clark, and H. C. Bois.

All committees work under one great difficulty in that it is impossible to get all members together during the year. The investigations must be conducted by correspondence. The report for this year is based on correspondence with men who are engaged in business, in farming and in professional work in the Colleges and Provincial and Dominion Departments.

The organization of the Economics section might relieve the Committee of its special responsibility. The Economics group is sufficiently wide in its personnel, I presume, to include all interested parties and so might readily devote some time to a discussion of Marketing Education. Up to this time

no specific recommendations have been made by the Committee. In this report some conclusions are drawn and some recommendations made. Also some questions are raised. The questions raised may be of most importance.

Tentative Conclusions

(1) The conclusion is warranted that Marketing Education is worthy of a more prominent place in college curricula. Along with Agricultural Economics, Marketing might readily be given equal status with other major subjects.

(2) The type of training for men majoring in Marketing should include a general basis in Science, Mathematics, Economics and Languages and also specific training in Animal Husbandry, Horticulture, Poultry Husbandry and similar topics. A knowledge of production methods, grades, types and standards is held to be essential. Stated negatively, the training should not be primarily descriptive but rather economic and scientific supplemented by studies of the details of the marketing of various commodities.

(3) That a large number of important industrial concerns are now employing college-trained men and that there is a tendency on the part of some to give preference to the college-trained boy. Further encouragement might be offered in this respect.

(4) The courses offered in the various colleges are gradually being strengthened. Courses on principles of Economics, Finance, Commerce in relation to agriculture, Statistics, Land Economies and Accounting are open to students in Agriculture in some institutions. The work in at least four institutions has been materially strengthened in the last two years.

(5) The idea of special short courses in Marketing for farmers seems to meet with favor everywhere. To date, however, but little work of this nature has been done. It is a field that is worthy of further consideration and development. The type of work suggested for these courses is outlined in last year's report under the heading of 'Special courses in Marketing'.

(6) A study of the personal opinions of the men who are carrying on the work in the various Provinces points to the conclusion that all are not satisfied with their accomplishments even though their efforts are great. It would seem from the replies, that we have not yet discovered and used all fundamentals in relation to marketing and that in all fields we are still groping for a light to guide us. Much has been accomplished but more remains to be done.

The Situation at Present

It is felt that something has been accomplished in recent years by bringing marketing and production specialists together in their thinking. Marketing may be one field of study and production another but the two are so closely related or intertwined that they are inseparable. The production and distribution of farm products are divided into two fields for purposes of academic discussion only. In practice they are one.

A long step toward the solution of the problem depends on the end from which we start. Am I as a producer to take the stand that since I have grown something of a certain grade or quality, some consumer must of necessity buy it from me at a price that will give me a profit? The consumer

has a wide choice of commodities and, consequently, he may or may not purchase my particular product and pay me my cost of production plus a reasonable profit. Producers must study markets and market demand. There is some possibility of finding a market for all and sundry that we have produced. There is more to be accomplished, however, by studying market demand, the quantity and the quality and endeavoring to educate our producers and distributors to supply this at a price which the consumer can pay. The market demand may differ in Britain and in the United States. The home demand may differ from either. The point is for the producer to give the consumer what he wants. Marketing begins with the consumer and in world markets. From this end we work back to production and production at a cost that will permit of sale at a profit.

To quote in relation to the above point from a correspondent who is farming, "This subject is very intriguing for study and theoretical purposes but usually very abortive for practical suggestions." We agree with him, but the principle could readily become a part of general educational work in Marketing.

A second idea which is prevalent but which may be dying a natural death is the fallacy that a man is entitled to his cost of production plus a profit. This idea is tied closely to the main principle of consumer demand. The best answer to the fallacy seems to be in the question, whose cost of production are you going to use as a basis?

All studies on the problem indicate that seldom are the production costs of any two men equal. Costs range from very high to relatively low. In apples in British Columbia, costs on individual farms including wages and interest range from 66 cents to $2.31 a box; in butter fat from 24 cents to $1.41 a pound and in eggs from 16 cents to 59 cents a dozen. It is obvious from these figures that some men lose money and some make considerable profits. It is quite clear also that if for purposes of price-making a weighted average cost is taken as the basis, fifty per cent of the product would be produced at a loss and fifty per cent at a profit. The wiser and safer plan is to take the market price as a basis from which to work, if possible the market price over a period of years and then endeavor to get production cost within it. This later point, *production cost,* definitely relates production and marketing.

The third aspect is in the means of accomplishment. For purposes of discussion all official bodies might be grouped together and all producers' bodies considered as one. This is done with the idea of separating those who must market their products from those who would advise them on marketing. It is held that the main strength of new movements in the marketing of agricultural products must come from the producers themselves. What do they want and what can they accomplish? The idea of improvement in marketing must first be firmly imbedded in the minds of the producers and it appears that permanent improvement in marketing can be attained only in this way. The movement for improvement must be firmly rooted in the soil and to a very large degree the spirit of the movement for improvement must come from the men who are on the land. One farmer correspondent writes: "Perhaps the problem of marketing can only be solved by the pro-

ducer himself. If such is the case, a thorough investigation should establish the fact. If on the other hand, aid can come from outside sources, the amount of such aid should be possible of determination and also whether the aid should be Federal or Provincial or from other sources." Official bodies can lend technical assistance. This assistance may be in the form of improvement of products or of production methods. It may be in the form of a system of accounting for a coöperative or in other technical ways, but the movement itself must be based on the soil.

The Fundamental of the Problem that the Producer Faces

It would seem that agriculture is still under pressure from the general acceptance of the idea propounded more than a century ago that population is pressing on the food supply and that population is even today increasing faster than the food with which to feed the fast growing millions. On the other hand, it can not be emphasized too fully that in spite of the persistence of the theory, the world is better fed than ever before and each decade or score of years sees a marked advance in living standards. We rather take the view, and it can be readily supported by arguments and statistics, that there is a steadily increasing pressure of food on the markets both local and throughout the world at large. Please note that it is not stated that there is a pressure of food on the population of the world though such is the case here and there, but rather a pressure of food on the markets of the world. Particularly is this so of Canadian farm products. It is indeed the exception to find at times a farm product in Canada where the demand greatly exceeds the supply. Consequently, then, we have almost invariably a buyer's market with thousands of Canadian farmers offering supplies and bidding against each other for the privilege of selling. This is to a large degree a world condition also.

It should be pointed out also that to a very large degree the agricultural policy of Canada is dictated by the group of men known as the business men and secondly by, to at least an equal degree, the transportation companies. That part of the business group which handles agricultural products naturally wants a plentiful supply of products to handle. They are concerned in handling the greatest number of units at a spread that will give them the greatest profits. Numbers of units to handle are of marked importance. The storage companies and packing houses are interested in the largest possible number of units also. The transportation companies are always interested in more bushels or tons of freight. Their rates are fixed and their income consequently varies with the number of units they handle. These groups, the business and the transportation largely, dictate the agricultural policy; and being concerned with quantities primarily, are naturally asking for increased production always. As a consequence, we have a steady pressure of supplies on the markets with the consequent low price to the farmer that is common to a buyer's market. An accelerated educational campaign that would give the producer himself a greater knowledge of markets and market demands both as to quantity and quality and some idea of costs and spreads would be in the interest of Canadian Agriculture.

Is the Answer to the Problem to be Found in the Coöperative Movement?

The greatest movement of modern times for improvement in the marketing of agricultural products is known as the Coöperative Movement. Cooperation has led undoubtedly to marked improvements and will possibly lead to greater improvements. At the same time, some of us have begun to ask the question as to whether or not coöperation as we know the movement today is the ultimate end.

The Coöperative Movement, as we know it, is based largely on a community interest and a national interest. The common good is emphasized. Groups band together for marketing purposes, advance production, improve quality, bargain effectively. The individuals and the communities alike benefit from the combination. I think all admit the effectiveness of established coöperatives on the improvement of conditions generally. They tend to raise the status of the members and the community generally. But our statutes and economic laws and codes of business ethics are such that it is quite proper and honorable to remain outside of a community movement in order to profit by it when once it is established. Private business initiative is not slow to profit by advantages of community movements and such other advantages over and above these as they can attain. The men who remain outside of the coöperatives can often capitalize the advantages of the cooperatives and their own individual initiative as well. This principle could readily be elaborated at length but it is not necessary here. It must be pointed out,however, that in this possibility, that is, the possibility of the few taking advantage of the efficiency and effectiveness of the many, are to be found some of the seeds of decay in coöperatives. It raises the question of compulsory coöperation—and then from a practical point of view, what percentage of the total must desire a particular reform before it becomes compulsory on all? Democracy legislates on a basis of any percentage more than fifty. Money by-laws usually require sixty per cent or more. The question will have to be answered sometime in Canada—what percentage will be necessary for control in the marketing of farm produce?

Research

No mention has been made so far in this report with regard to research. We take research for granted, provided, of course, that qualified men are available to undertake it.

Division of Effort

Federal. National policies—export and domestic—in relation to various commodities, such as the work with bacon hogs, etc., by the Live Stock Branch, the enforcement of laws, rules and regulations, grading and inspection, and similar work.

Provincial. The organization of associations, local marketing problems, detail and technique in connection with marketing, accounting, management and similar problems.

Colleges. Study of principles, research work, and general educational policy.

All three of the above must be closely coördinated.

The Producers. The producers or farmers themselves are the important factor and before much can be accomplished, they must have the will to do. This will to do presupposes an understanding of the problem or at least a desire to learn and accomplish.

RECOMMENDATIONS:

1. That the colleges and universities be asked to give consideration to the organization of a marketing Major as part of an Agricultural Economics option and that the courses be based on Principles of Economics, Money and Banking, Statistics and other fundamentals in addition to technical courses in relation to the various commodities.
2. That the Dominion Department of Agriculture be asked to consider ways and means whereby the Branch of Agricultural Economics now being organized will be given an opportunity to coöperate fully with the provinces and with the men now engaged in marketing to the end that all effort may be coördinated and the greatest good accomplished with the men and money available from the various sources.
3. That the Economics Section together with men from the various marketing divisions be asked to devote some time to a discussion of the marketing problem and that for next year the marketing committee be a committee of the whole Economic Section but that a sub-committee from this group be asked to be prepared to report specifically on the problem next year.

REPORT OF C.S.T.A. COMMITTEE ON AFFILIATIONS

L. H. NEWMAN, *Chairman*

During the past year your Committee on Affiliations has endeavoured to interest a number of organizations in our Society. On October 30th last, I wrote Mr. Arthur Gibson, Dominion Entomologist, with a view to ascertaining whether or not the Ontario Entomological Society might be interested in becoming affiliated with the C.S.T.A. I also took the matter up with the Canadian Branch of the American Phytopathological Society and later with the Canadian Veterinary Society. The first two societies explained that under present circumstances it would hardly be possible to work out a satisfactory basis of affiliation. The latter society will meet next month and will discuss the matter in detail. At present, we are informed, there is no official organ for the Veterinary Society in Canada but that all articles on veterinary science have to be published across the line. It was pointed out to representatives of the above society that *Scientific Agriculture* might provide a suitable means, or medium, through which to publish their contributions.

While the present report may not appear very encouraging, it must be remembered that we already have affiliated with us many of the leading societies in Canada. We also feel quite sure that as time passes other societies who might use our journal to advantage, will become affiliated with us.

REPORT OF C.S.T.A. COMMITTEE ON PROGRESS

J. MACGREGOR SMITH. *Chairman*

There are two questions that I should like to bring up and in doing so, believe that they would materially help this Society to make progress. I will deal briefly with them.

(1) The desirability of getting the local Secretaries to our annual Conventions. The local Secretary is the most important member of any Provincial local executive. Each local should make an effort to assist financially in seeing that their Secretary gets to this meeting. If this is impossible at present, then the Western men might get together, the Eastern men and also those in the maritime Provinces. These men would have a round table conference, and after discussing their problems and being full of enthusiasm about the Convention, would go back to their work—(please bear in mind it is a real job)—with beneficial results to their own local which would be reflected in the work of the parent organization.

(2) The Master Farmer Movement:—I have been interested in this movement in the United States for some time. It was organized under the auspices of the Association of Farm Papers, entitled "The Standard Farm Paper Editors Association". Last December I wrote to Mr. C. V. Gregory, Editor of Prairie Farmer, Chicago, made some inquiry regarding the organization of this Movement, suggested that there was a possibility of it being started in Canada, and that it was most desirable to see that it was started on a uniform basis, and in such a manner that the standard would be somewhat comparable to that of the American Association. I had a reply to this letter and a copy of it is attached to this report.

I then took the matter up with the Dominion executive, and the reply was favorable to having the matter discussed at this convention. A subsequent letter from Mr. Gregory stated that he was bringing up the question at a meeting of the Standard Farm Paper Editors Association at the end of January.

At a meeting of the Alberta Branch, I presented this idea, and the following resolution was passed unanimously. "Resolved that we, the members of the Alberta Branch of the C.S.T.A., urge the Dominion Executive to consider the question of inaugurating the Master Farmer Movement on a uniform basis in the Dominion of Canada." To summarize my idea I would briefly point out that the movement, if it is worth starting in the Dominion, is worth starting on a solid and a uniform basis. This Society can do nothing further than draw up suggested rules and regulations. It would then be the duty of each local to interest the proper party in their respective Provinces in the carrying out of the scheme. In one Province the College of Agriculture might handle it through its Extension Department. In another Province, perhaps the Department of Agriculture might handle it, and there may be other ways by which a selection can be made. The main idea however, would be that the standard of a Master Farmer in the East would be somewhat equivalent to a Master Farmer in the West, although their score cards might be modified to suit their respective conditions. It would make a point of contact between the technical men and the efficient and successful farmer, which would be to the mutual advantage of both.

Appendix

December 24, 1928.

Prof. J. Macgregor Smith,
College of Agriculture,
University of Alberta,
Edmonton, Alberta, Canada.

Dear Professor Smith:

I appreciate very much your good letter of December 8th. The Master Farmer plan which has become nation wide in the United States is controlled by the Standard Farm Papers. Our chief concern in letting others use the plan is that they should have the same idea for it and put the same effort back of it in order that the standards may be maintained. We believe that the term Master Farmer should be carefully protected so that the Master Farmer in one part of the country will be a man of the same high character and accomplishments as the man in another part.

I agree with you that it would be a fine thing to have such a movement started in Canada. I wish you would let me know what your thought is regarding this, whether you would have it conducted by your college or by some other institution. We have a meeting of the Standard Farm Paper Editors' Association the latter part of January and at that time I shall be glad to bring the matter up and see if they are willing to grant you permission to use the plan. It will be helpful, however, before that time if I can have some idea as to how you would handle it.

The way our papers handle this matter is to ask for nominations. Each nomination must be accompanied by a score card completely filled out. When these applications are returned we are able to limit the nominees. The rest of these are visited personally by competent men who interview the nominee as well as other people in the neighborhood and make out a final score. We find that this personal checking is necessary and it means in addition to this, of course, that the largest itemized expense occurs. We find, too that it is entirely advisable to dignify the awarding of the medals by doing it at an annual banquet at which a large number of agricultural and business leaders are present. It is the custom of our papers to make these banquets complimentary affairs, although that, of course, is not absolutely necessary.

Yours sincerely,

(Signed) C. V. Gregory.

REPORT OF C.S.T.A. COMMITTEE ON AGRICULTURAL POLICIES

E. A. Howes, *Chairman*

The Canadian Society of Technical Agriculturists has had under consideration at each of its annual meetings during the past two years, the reports of a special committee composed of both Federal and Provincial agriculturists, appointed to study ways and means to secure coördination of effort to promote the science and practice of agriculture, as between Federal and Provincial institutions and organizations. It would seem that apart from the very general definition of the duties and responsibilities prescribed

in the British North America Act, no sustained attempt has heretofore been made to establish principles that may serve as a guide to responsible administrative officers of the Federal and the Provincial institutions and organizations in the development of a policy that may reasonably be expected to harmonize with the policy of the others. It is believed that the study of this problem ought to be continued by the special committee of this Society and the reports thereof be made subject to the careful consideration and disposition of the Society and be published for general distribution. It is recommended that this Society adopt the following tentative conclusions and make them known to those who may be responsible for the making and carrying into effect of governmental policies for the promotion of agriculture:

I. That institutional teaching shall be the exclusive duty and responsibility of the Province. That the extension of agricultural teaching pertaining to production shall likewise be the duty and responsibility of the Province and ought not to be undertaken by any officers of the Federal Department of Agriculture unless and until the approval of the Minister of Agriculture or Minister of Education for the Province has been obtained.

II. The development and control of inter-provincial and international trade and commerce shall be the exclusive duty and responsibility of the Federal governing body. The development and control of intra-provincial trade and commerce shall likewise be the duty and responsibility of the Federal governing body in so far as Federal laws may apply. The dissemination of information pertaining to inter-provincial and international markets, the quantity and quality requirements of markets; the Federal laws, regulations and standards; and the results of investigational or research work done under the direction of the Federal government shall be the duty and responsibility of the Federal governing body.

III. The interprovincial and international control of diseases of animals and plants and of insect or other pests shall be the exclusive duty and responsibility of the Federal governing body. The intra-provincial control of diseases of animals and plants and of insect or other pests shall be the duty and responsibility of the Federal governing body in so far as Federal laws may apply.

IV. Investigational or research work pertaining to matters or functions that are of themselves the duty and responsibility of any one governing body shall likewise be the duty and responsibility of that body. All institutions for higher education shall not, however, be subject to any expressed or implied limitations as to any investigational or research work on subject matter that may reasonably be included in any of its major courses of prescribed studies.

Investigational and research work in general shall be the privilege and opportunity of provincial governing bodies and colleges: and the duty and responsibility of the Federal government to conduct either directly or through the medium of agencies not under its immediate direction.

V. Coöperative endeavour in the marketing of farm products or the manufacture of agricultural products or in the purchase of supplies

ought to be regarded as the opportunity and responsibility of the farmers and the organizations that they voluntarily form for that purpose, but the extension of teaching the principles and practices of coöperative endeavour to farmers individually and collectively shall be the duty and responsibility of the Province. The establishment of centers for receiving, conditioning, assorting, packing, grading, storing and shipping on orders from the owners of farm products intended for interprovincial or export trade shall be the opportunity and responsibility of the Federal governing body as a service that may be provided to the public in general and to farmers coöperatives in particular.

VI. It is recommended that this Committee be entrusted with a still wider field of work during the coming year and the following activities are suggested:

1. To make a thorough survey of agricultural policies as existing in each Province, this to include all Federal and Provincial Departments, Industrial Companies, or others engaged in agricultural research, educational or field work, including publications of an educational nature.
2. The objects of this survey should embrace the following:
   (a) *Overlapping Policies*: Where such exist as a source of irritation or friction full particulars should be obtained and reports with recommendations be prepared for all the departments or institutions concerned.
   (b) *Provincial Committees*: That special study with recommendations be made as to the formation within each Province of special advisory committees representing each important phase of agricultural endeavour, on which committees shall be representatives from each department or institution doing such work.

VII. That thought and study be given to the all-important question of the establishment of definite ethical standards in the matter of publicity and propaganda in connection with agriculture. It is recognized that our Society can exercise only moral control in this field, but it is felt that it is time that we consider carefully the effect upon our profession of premature publicity, free-lance expression of opinion, and, in general, a yielding to the temptation to rush into print. There is here no thought of fettering individual expression, but rather a desire to foster habits of study of all the factors involved, before anything is given to the world as the mental product of a technical agriculturist. This thought is here expressed to put the idea on record and expressed with the hope that this Committee shall be able next year to make recommendations that may be of service to the well-wishers to Agriculture.

Editor's Note: In accordance with the expressed wish of Dean Howes, the following extract from an address given by him to the C.S.T.A. in 1926, is appended:—

"The next point I would like to make is a somewhat daring one, but I must go on record as saying that I do not think agriculturists enhance their status by their prevailing for publicity. Perhaps you know that it was an agricultural writer who was first called a "hack-writer" and his prepotency is scarcely subject to question. This man was haled to London and forced to sign the following declaration:—

> "I, Gervase Markham, of London, gent., do hereby promise hereafter never to write any more book or bookes to be printed of the diseases of any cattle, horse, ox or cow, sheep, swine or goats. In witness whereof I have hereunto set my hand the 24th daie of July, 1617. Gervase Markham."

The writer of the first Scottish treatise on agriculture admitted quite naively that he had made a failure of farming and was now going to write about things agricultural because he had been told that there was good money in it. We will never be able to achieve 100 per cent dignity in the matter of publicity, but I do think that our Society can be a wonderful influence in retaining this sort of thing to reasonable bounds. We can build up a tradition to the effect that "this sort of thing isn't done." It is a grim fact that many of our best services in agriculture have been accompanied and preceded by a verbal chinook, written and spoken. It is also a grim fact that often the value of some of our research work is bankrupted by advance notices.

It is a matter of history that the common use of such important crops as clover and turnips into England was impeded almost to the extent of half a century by the disrespect into which technical agriculturists of that day had fallen, because of their exaggerated statements in regard to these and other crops. Lord Ernle, in speaking of this period of the early dawn of agricultural science remarks about the agricultural men of that day:—

> "Their promises were often exaggerated beyond the bounds of belief; mixed with some useful suggestions were others which were either ridiculous or of doubtful value. Men actually and practically engaged in cultivating the soil were, therefore, justified in some distrust of book-farmers. Turnips were undoubtedly an invaluable addition to agricultural resources. But it was an exaggeration to say with Adolphus Speed that they were the only food for cattle, swine and poultry, sovereign for conditioning "hunting dogs", an admirable ingredient for bread, affording "two good crops" each year, supplying "very good syder" and "exceeding good oyl."

I do not mean to say that our profession has a monopoly on this sort of thing, but I do ask you how certain performances that must have come to your notice would have been challenged in any other technical profession. It is true that as a Society we can only advise; we are not working with disciplinary powers. That day may come, and despite our various interests I am none too sure that it would be altogether a bad thing. As one who is older than most of you, and cannot possibly have an axe to grind, I wish to exhort every member of our Society to think seriously of the dignity of his profession and of the building up of a tradition; not only upon whatsoever things are true, but also upon whatsoever things are fitting. Now, of course, this cap does not fit any of us who are here, but most of us know somebody it would fit."

MEMORANDUM OF C.S.T.A. COMMITTEE ON EDUCATIONAL POLICIES

L. S. Klinck, *Chairman*

At the outset, the Chairman of the Committee on Educational Policies wishes it to be distinctly understood that this is a memorandum and not a report of the standing Committee on Educational Policies, neither is it a report of a sub-committee of that body.

The introduction is purely explanatory; the vital part of the memorandum is contained in the communications from Mr. C. E. Boulden and Mr. L. C. Roy. The statements made by these gentlemen were prepared at the request of the Chairman, in order that the conference might be better informed as to the nature and the scope of the task which last year's Convention assigned to this Committee.

Although Mr. Boulden and Mr. Roy were the prime movers in urging upon the 1928 Convention the necessity for the adoption of a resolution which specifically directed the attention of the Committee on Educational Policies to the subject of extension work, neither of these gentlemen wished to serve on the committee. They did consent, however, to commit to writing their reasons for urging that this aspect of agricultural education be given immed-

iate attention. The Chairman wishes to convey to these members his appreciation and thanks for the views which they have expressed regarding the nature and the scope of this approved study.

Two principal causes account for the fact that your Chairman has no official report to present at this Convention. The first is that he has been on leave of absence for the greater part of the year; the second is that, until very recently, he could obtain no authoritative information as to the major questions in extension work which it was proposed his Committee should study. A preliminary discussion with Messrs. Boulden and Roy in Quebec in June last, while very suggestive, left much to be desired in that the Chairman was still unable to state clearly and concisely just what the problems were upon which the Society wished the Committee to report. Hence, he requested Mr. Boulden and Mr. Roy to submit their views in writing. This they have done most effectively in the following statements:

SUGGESTIONS MADE BY MR. C. E. BOULDEN

"That the activities of the C.S.T.A. include, as well as all matters of agricultural research, the dissemination of agricultural knowledge and results of current research, is admitted by all members; that this section has not been developed by the Society is obvious, not only by the attendance at meetings, both local and general, but also by reading the Society's official organ, "Scientific Agriculture".

In all industrial and commercial enterprises a large proportion of time, energy and expense is devoted to the problem of advertising as compared with the manufacturing end. We may not like this term applied to the matter under discussion, but at least it must be admitted that agricultural knowledge, results of experimental research, etc., are not of value to the industry or community as a whole until they have been at least partially adopted and finally acted upon. Upon whom does this responsibility lie if not upon the members of the C.S.T.A.? There are many individuals and small groups endeavoring to carry on the work of vocational education, extension, etc., but it is the writer's opinion that in the majority of cases this work lacks the scientific methods of application. The fact that it is in itself a rather peculiar undertaking, demanding a certain type of personality and considerable individual effort and understanding which must come from the individual concerned, does not signify that more cannot be accomplished by a careful investigation of methods and results.

An example somewhat corresponding to this I think might be quoted. For years specific studies in agriculture ,such as Animal Husbandry, Field Husbandry, Horticulture, Entomology, etc., were the standard subjects taught at Agricultural Institutions. Such subjects as Farm Management, Marketing, Agricultural Economics and similar subjects were not considered at all. There are many I feel, even in professional agriculture, who look upon the Extension Service work in very much the same way as these subjects were looked upon in the early days of agricultural education. With study and research these newer subjects have become of vast importance in agriculture.

That there is a marked desire from the men engaged in this work to receive further information is evident and after having tried many sources as Assistant Editor of the Society's organ, "Scientific Agriculture", to secure suitable articles, it seems that there is need for more scientific survey upon the subject.

In view of these facts, I am making these suggestions to your committee through whom I feel much valuable work may be initiated in studying methods already used, possibility of developing other channels and resulting in a better dissemination of the knowledge we already have and results of current research.

In order to accomplish this I think that a group formed in the Society covering work such as Agricultural Extension, Vocational Education, etc., would probably be another step to facilitate a more scientific study and more scientific methods in the carrying on of this work."

January 31, 1929."

LETTER FROM MR. L. C. ROY

"At Eric Boulden's request and your kind invitation I will venture to put down on paper some thoughts that I have had on my mind for some time regarding Scientific Extension Work. However, in presenting these impressions I criticize no one and merely wish, like my friend Boulden, to draw attention to a phase of our Scientific Agricultural Work that is apparently not given enough consideration.

From the fieldman's standpoint, it would seem that we are all too academic and not worldly enough when it comes to "selling" our scientific knowledge to the farmer. As scientific men, we probably do not spend enough time on methods "to put across" our agricultural knowledge and the results of our experimental and research work. Some of us feel that this part of our agricultural work is neglected and that the C.S.T.A. might probably start something that could be of benefit to the fieldman. After all, what counts the most in the end is the application of all these principles by the ordinary average farmer.

The information we need should be made available to us in a more digestible and concentrated form, keeping in mind the poor absorbing qualities of the farmer. An extension man, by the nature of his work, gets to have a general knowledge and become probably more of an organizer; he does not seem to find time to dig up material, his time is limited for getting information and there seems to be a long felt want for a readily available reference service that will permit him to grasp the essential points on a given subject and give them to the farmer in short order.

Our lectures should be so arranged that they can be visualized by our audience. This can be very well illustrated by a recent booklet written by Prof. Crampton for the Royal Bank, entitled "Feeding and Better Livestock" which compares the dairy cow to an animal factory. He uses such terms as receiving department, sorting department, power plant, repair department, refuse department, production department, fuel storage, which is an interesting and catchy way of treating this generally difficult subject.

Eaton's Farm and Home Bulletin is another example; it reproduces farm bulletins in a brief, easy to read form.

Experimental and research work are of the utmost importance for the further advancement of Canadian Agriculture and I do not offer any criticisms of the present system of disseminating knowledge; it no doubt has its place for the complete information given, but for the fieldman, better and quicker means should be found to make results known and applied on the farm.

We need experts, such as advertising agencies have, to continually study the best methods of reaching the public.

I have probably expressed myself very bluntly on this matter and more from a fieldman's view; no doubt I bear correction in some of my assertions. But I send you these suggestions in the best spirit and hope something may come from them.

April 25, 1929.

C.S.T.A. RESOLUTIONS

The following resolutions were passed at the Ninth Annual Convention, June 15, 1929:—

1. RESOLVED that a vote of thanks be extended to the Manitoba Department of Agriculture, the Dominion Experimental Station at Morden, the Manitoba Agricultural College and the T. Eaton Company, Limited for their generous hospitality and entertainment to the delegates, members and guests attending the 9th Annual Convention of the C.S.T.A.

2. RESOLVED that a vote of thanks be extended to the Federal Department of Agriculture for providing a series of lectures by eminent authorities from the United States on subjects of special International importance in Agricultural research and also to the Empire Marketing Board for the visit of Dr. F. A. E. Crew of the University of Edinburgh, whose lectures on genetics and the aims of the Imperial Bureaux were so timely and educational.

3. RESOLVED that our Society extend its deepest sympathy to the relatives of the following members, who have died since our last annual meeting: J. P. Spittall, Gordon S. Matthews, J. Bernard Hoodless, George C. Creelman.

4. In view of the great benefits that are likely to come to our Society and to Agriculture, through the advanced training of agricultural students,

and the fine example set for others interested in the development of Canadian agriculture, therefore be it resolved that the most hearty thanks of the Society be extended to the T. Eaton Company Ltd., for donating the five Scholarships of $600.00 each, to be awarded this year.

5. RESOLVED that the thanks of this Society be extended to the eight commercial firms who contributed towards the rental and equipment of new headquarters for the Society at Ottawa.

6. RESOLVED that the thanks of our Society be extended to the Chilean Nitrate Committee for their grant of $600.00 to assist in our office administration.

7. RESOLVED that the thanks of our Society be extended to all Institutions which are giving grants to assist in the publication of *Scientific Agriculture*. These are as follows: National Research Council, Dominion Department of Agriculture, Macdonald College, Ontario Agricultural College, the Universities of Saskatchewan, Alberta and British Columbia and the Provincial Departments in Nova Scotia, New Brunswick, Quebec, Saskatchewan, Ontario and British Columbia.

8. WHEREAS the Civil Service Commission of Canada has recommended a reclassification of the positions and salaries of the professional and scientific civil servants, engaged in Agriculture;

AND WHEREAS the Dominion Government has appointed a Royal Commission to investigate and make recommendations concerning the reclassification and salary revision of the professional civil servants of Canada; Therefore, be it RESOLVED that we authorize our Executive to take the necessary steps to make representations before this Royal Commission in the interests of our members concerned.

9. RESOLVED that the thanks of our Society be extended to the International Education Board of New York for providing the means to make a survey of agricultural research facilities in Canada and the publication of a graduate calendar based thereon, and that the thanks of the Society be also extended to Dr. Robert Newton for the work he has done on this survey and the comprehensive report submitted at this convention.

10. RESOLVED that the best wishes of the Society be extended to Professor H. M. Nagant, who for the past four years has acted as French Secretary of the Society and French Editor of *Scientific Agriculture,* for his speedy recovery from his present illness.

11. RESOLVED that the thanks of the Society be extended to the following special lecturers who have given so freely of their time and have contributed so generously to this convention:—Dr. F. A. E. Crew, Dr. M. J. Dorsey, Dr. W. E. Grimes, Dr. H. B. Humphrey and Dr. W. L. Williams.

AGRICULTURAL ECONOMICS GROUP

The formation of an agricultural economics group within the C.S.T.A. was completed at the recent convention held at the Manitoba Agricultural College, Winnipeg. Dr. J. E. Lattimer, Macdonald College, who so effectively directed the work of the organization committee appointed last year, was elected chairman of the group with Mr. H. R. Hare, vice-chairman and Mr. W. V. Longley, secretary. Nineteen signed as members of the group at the convention meetings. In stating their preference one hundred and eighteen members of the C.S.T.A. have expressed a preference for the economics group. The group is thus assured of a large membership. As shown at the convention, the group will include not only members from various governmental departments and educational institutions, but men from the coöperative marketing field and from the business world as well.

The need of Canadian texts on agricultural economics was one of the things stressed at the meetings held. A committee was named with Dean F. M. Clement, University of British Columbia, as convener on "Text Books and Publications". The question of a text on Marketing will first claim the attention of this committee.

The economics group was particularly fortunate in having on the program of the group meetings as well as one of the speakers at the general meeting, Dr. W. E. Grimes, Chief of the Division of Agricultural Economics, University of Kansas. Dr. Grimes in his address before the general meeting very ably brought out in his paper "The Effect of the Combined Harvester-Thresher on Farming in a Wheat Growing Region" the trend of the times in the use of machinery in agriculture and the economic and social effects resulting therefrom. His talk before the group meeting on "The Effect of Change in Human Relations on Bargaining Power" was also very timely in pointing out changing relationships in the marketing of farm products.

The need of better agricultural statistics was pointed out very clearly by Dr. Andrew Cairns, statistician for the Canadian Wheat Pool. Dr. Cairns indicated how the wheat pool was meeting the situation and some of the means it was taking in the obtaining of better statistical information on which to base their selling program.

Dr. J. F. Booth, formerly of Saskatchewan, now with the United States Bureau of Agricultural Economics, spoke on the activities of the bureau, its organization, scope of its work, and methods used in furthering coöperative marketing in the country to the South.

Activities in the field of agricultural economics were discussed by Dr. W. Allen of the Department of Farm Management, University of Saskatchewan, Mr. W. V. Longley of the Nova Scotia Agricultural College, and Mr. P. H. Ferguson, secretary of the Davidson Coöperative Association, Davidson, Saskatchewan. Regional Economic Problems were discussed by Dean F. M. Clement for British Columbia, Dr. W. W. Swanson, University of Saskatchewan, Mr. H. S. Fry of the Saskatchewan Wheat Pool and Mr. R. D. Colquette, Country Guide, Winnipeg, for the prairie provinces.

W.V.L.

AUX MEMBRES DE LANGUE FRANCAISE DE LA C.S.T.A.

M. H. M. Nagant, Professeur à l'Institut Agricole d'Oka, qui depuis 1925 occupait avec un inlassable dévouement les fonctions de Secrétaire français de la C.S.T.A. et de rédacteur français de "La Revue Agronomique Canadienne", a malheureusement dû pour des raisons de santé donner sa démission, au grand regret de tous les membres, non seulement de langue française, mais aussi de langue anglaise, parmi lesquels il ne comptait que des amis. Pendant deux ou trois mois la section française de "La Revue Agronomique Canadienne" n'a guère pu paraître. Elle reprend sa place légitime à partir de ce numéro.

Le nouveau Secrétaire français adresse un pressant appel à tous les membres de langue française de la C.S.T.A. Ils ont le droit et le devoir de développer une section française aussi vivante, aussi variée, aussi intéressante que la section anglaise. En dépit de tous les efforts, cette section française ne peut être l'oeuvre d'un seul homme ; il faut qu'elle soit l'oeuvre de tous ceux qui s'y intéressent. La plupart, pour ne pas dire tous, les membres de langue française ont dans leur expérience présente ou passée la matière d'un ou plusieurs articles intéressants. Le Secrétaire français compte sur la collaboration active de tous les membres pour avoir une section française digne de notre association et de sa revue.

PROMOTIONS AU MINISTERE DE L'AGRICULTURE DE QUEBEC

Un des premiers soins de l'Hon. M. Perron en prenant à Québec le portefeuille de l'Agriculture a été de réorganiser les différents services du Ministère. Le Ministère de l'Agriculture est maintenant au point de vue technique divisé en quatre services : Service des Agronomes, Service de l'Economie Rurale, Service de l'Industrie Animale, Service de l'Horticulture. La direction de ces services est confiée respectivement à M. Narcisse Savoie, M. Henri Bois, M. Stanislas Chagnon et M. J. H. Lavoie. Ces quatre services sont à leur tour placés sous la direction générale de M. Louis Philippe Roy, docteur ès sciences, nommé Directeur des Services du Ministère.

MM. Roy, Savoie, Bois, Chagnon et Lavoie sont tous cinq des membres particulièrement actifs de la Société des Agronomes Canadiens, dont M. Roy fut Président pendant l'Exercise 1927-1928. Tous les membres de la Société sont heureux de la promotion de leurs collègues et les en félicitent bien vivement.

LA SITUATION AGRICOLE EN RUSSIE

Les nouvelles qui viennent de Russie sont toujours un peu sujettes à caution. En raison cependant de la concurrence qu'une agriculture russe prospère ferait à l'agriculture canadienne sur les marchés européens, il nous parait intéressant de résumer brièvement un rapport sur la situation agricole en Russie qui se trouve dans la "Soviet Union Review" de juillet-août 1929. Le rapport en question a été présenté par Kalinine au cinquième Congrès fédéral des Soviets qui s'est tenu à Moscou au mois de mai dernier.

Il semble que la superficie ensemencée atteigne cette année 96.6%, de la surface d'avant guerre, les nombres indices étant pour les récoltes industrielles 158.5%, pour les grains 90.1%, pour le bétail 102.4%. Il semble aussi qu'il y ait eu amélioration marquée des procédés culturaux au cours des dernières années, particulièrement en ce qui concerne les assolements, le labourage des terres de bonne heure, l'emploi de semences améliorées et sélectionnées. Le nombre des machines agricoles serait deux fois et quart celui d'avant guerre. 40,000 tracteurs seraient en usage. Il semble que la culture moyenne surtout soit celle que le Gouvernement des Soviets cherche à développer. Un tiers des paysans ont organisés en coopératives agricoles et le nombre des collectivités agricoles (lesquelles sont des groupes de paysans travaillant la terre en coopération) serait maintenant d'environ 38,000, ce qui représenterait un avance de 140% sur l'an dernier. Les fermes du Gouvernement représentent une surface ensemencée de près de 4,000,000 d'arpents.

Kalinine a fait remarquer qu'en dépit des progrès rapportés le développement de la production du grain est beaucoup trop lent pour faire face à la demande. La grande majorité des cultivateurs opèrent encore de petites fermes morcelées avec des méthodes culturales primitives. La demande cependant augmente rapidement en raison de l'accroissement de la population et du développement de l'industrie. La population augmente annuellement de 3,500,000 personnes et ce surplus de population requiert de 350 à 500,000 tonnes de grain annuellement.

Parmi les mesures prévues pour les cinq prochaines années en vue d'améliorer la situation de l'agriculture russe on peut remarquer :—l'exemption de toutes taxes de 35% des cultivateurs, le développement des fermes gouvernementales, la mise en culture d'un supplément de 25 à 30,000,000 d'arpents de grain par le trust du grain, l'organisation de 85% des cultivateurs en coopératives agricoles, la distribution de 2,500,000,000 de roubles de machines agricoles, la fabrication de 88,000 tracteurs dans l'Union des Soviets et l'importation d'une grande quantité de l'étranger. D'autres mesures seraient prises pour le défrichement de nouvelles terres, l'amélioration de la technique agricole générale et la formation de techniciens agricoles.

La revue d'où sont extraits ces renseignements ne donne malheureusement aucun détail sur ce dernier point.

LA CONVENTION DE WINNIPEG

La neuvième réunion annuelle de la Société des Agronomes Canadiens s'est tenue à Winnipeg du 12 au 15 juin. L'endroit où s'élève aujourd'hui Winnipeg fut découvert il y a près de deux cents ans par un Canadien français, Pierre Gaultier de la Vérendrye. Ayant ainsi fourni sa contribution au succès de la Convention annuelle, la partie canadienne française de la Société s'est malheureusement abstenue d'aller beaucoup plus loin; sur une assistance de 175 membres, le nombre des membres de langue française s'est élevé à un maximum de trois pendant les deux derniers jours.

Le siège de la Convention était le Collège d'Agriculture du Manitoba, situé à quelque huit milles de la ville. Les différentes séances purent y être tenues dans une atmosphère de calme et de travail qui disposait naturellement les esprits à donner toute leur attention aux discussions et aux conférences. Le logement des délégués fut de même assuré au Collège d'Agriculture.

Le programme de travail comprit des séances générales et des séances spéciales aux différents groupes et sociétés affiliées à la C.S.T.A. (Société de Production animale de l'Ouest canadien, Agronomie, Horticulture, Economie Rurale).

Des conférences très intéressantes furent faites par des visiteurs de marque: Dr. F. A. E. Crew de l'Université d'Edimbourg, Dr. M. J. Dorsey d'Urbana, Ill., Dr. W. A. Grimes de Manhattan, Kansas, Dr. H. B. Humphrey de Washington, D.C., Dr. W. L. Williams de l'Université Cornell, Ithaca, N.Y. Chaque conférencier parla d'une part à l'une des séances générales, d'autre part aux réunions de l'un des différentes groupes. Toutes les conférences, dont la plupart seront reproduites dans la partie anglaise de la Revue, furent, chacune dans leur sphère, pleines d'intérêt; quelques-unes furent exceptionnellement remarquables.

L'importance donnée à la discussion des rapports comme aux réunions des différents groupes est à signaler. Ces séances de groupe, qui sont d'un caractère plus intime que les séances générales, se prêtent peut-être mieux à la discussion. "De la discussion jaillit la lumière". L'activité des débats provoqués par la présentation des rapports, débats dont l'intérêt parfois ne le céda en rien à celui des conférences, est un des signes les plus heureux de la vitalité de notre Société.

Un des points intéressants de la Convention fut le voyage à la Station Expérimentale fédérale de Morden, où un diner fut servi après la visite de la Station. Le temps lui-même fut de la partie, et l'horreur d'un voyage à travers le "Gumbo" par un jour de pluie est resté pour les délégués de l'Est à l'état de légende (ce dont nul certes ne s'est plaint). Au retour, l'occasion fut fournie de parcourir une partie de la zône où sont établis les Mennonites, comme aussi de traverser quelques villages canadiens français du comté de Morris.

Ce fut le privilège des membres de la Société des Agronomes présents à la Convention d'assister à plusieurs banquets. L'un leur fut offert par la Compagnie T. Eaton le 12 juin. Un autre, le 14 juin, fut donné par le Gouvernement Provincial du Manitoba, auquel les invités furent charmés par une intéressante causerie d'après-diner chargée de souvenirs historiques des premiers temps de la Province. La section du Manitoba de la C.S.T.A. offrit un déjeuner aux membres des autres sections dans le réfectoire du Collège le samedi 15 juin.

Parmi les décisions prises lors de la Convention, soit par la Société, soit par son Conseil de Direction, nous croyons nécessaire de mentionner les suivantes:—

La Convention de 1930 sera tenue au Collège Agricole de l'Ontario à Guelph, Ont.

M. Fred Pugh, du Bureau de Recherche de la Compagnie T. Eaton, Winnipeg, Man., a été élu Membre Honoraire de la Société.

Le Professeur W. R. Graham, du Collège Agricole de l'Ontario, le Dr. E. A. Howes, Doyen de l'Université de l'Alberta, et le Dr. W. P. Thompson, de l'Université de la Saskatchewan, one été nommés "fellows" de la Société.

Les cinq bourses d'études de $600.00 chacune données par la Compagnie T. Eaton furent accordées comme suit pour 1929: à M. Robert Henry Bedford, pour recherches à l'Université McGill (classification des organismes destructeurs de la cellulose dans les sols canadiens); à M. Neilson A. Drummond, pour recherches à l'Université de Toronto (mise sur le marché du

bétail canadien); à M. Kenneth Archibald Harrison, pour recherches à l'Université de Toronto (études de la maladie du "black knot" et de son contrôle dans les vergers de pruniers); à M. John Nicholas Welsh, pour recherches à l'Université de l'Alberta (études de plusieurs caractères génétiques de l'avoine); à M. Wilfred Hornsby Wright, pour recherches à l'Université de Toronto (études de maladies transmises par les semences).

M. H. M. Nagant, Professeur à l'Institut Agricole d'Oka, ayant dû pour raisons de santé donner sa démission de Secrétaire français de la Société, M. Henry E. Lefèvre a été nommé en remplacement. Il s'occupera également de la rédaction de la partie française de la Revue.

Les recommendations suivantes furent faites par le Comité des Publications:—

a) Les textes provenant de réunions des sociétés affiliées devraient être rédigés avec soin par le Secrétaire de la société en question ou par l'auteur, et soumis à l'approbation du Conseil de Rédaction de la Revue Agronomique avant d'être publiés.

b) La section des Nouvelles concernant les membres de la C.S.T.A. et les sections locales devrait être agrandie à un minimum d'environ quatre pages et imprimée sur un feuillet séparé envoyé aux membres avec chaque numéro de la Revue. Il est suggéré que le travail de collection de ces notes et nouvelles soit facilité par la nomination dans chaque section d'un correspondant responsable de l'envoi aux Editeurs des nouvelles intéressantes.

c) C'est seulement aux membres de la C.S.T.A. que cent réimpressions des articles devraient être fournies gratuitement; cinquante réimpressions seulement devraient être fournies aux auteurs qui ne sont pas membres de la C.S.T.A.

d) Il est désirable d'imprimer au dos de chaque numéro le nom de la Revue, le numéro du volume et le mois de publication.

e) La qualité supérieure de la revue au point de vue matériel devrait être maintenue et améliorée si l'état des finances le permet. Le comité est d'opinion qu'un feuillet préparé par une personne compétente et se rapportant aux meilleurs usages en ce qui concerne la préparation d'articles scientifiques serait très utile aux membres de la Société. Deux ou trois textes intéressants ont été publiés récemment à ce sujet. L'attention des membres est particulièrement attirée sur la valeur de la concision et aussi sur les économies qui résulteraient de textes concis.

f) Les nouvelles publications agricoles provenant des Universités, Collèges d'Agriculture et Stations Experimentales du Canada devraient être signalées dans le journal aussitôt que possible après leur publication.

Commençant avec le volume X en septembre 1929, un effort sera fait pour mettre en vigueur les recommandations faites par le Comité. Il n'est pas certain que l'état des finances permette dès maintenant la mise en pratique des changements suggérés, mais la plupart des modifications se rapportant à la politique de rédaction peuvent être considérées dès maintenant.

En terminant cette notice sur la Convention de Winnipeg il y a lieu de féliciter les différents comités d'organisation de la façon dont le programme a été arrangé et mis à exécution. Il y a lieu aussi de féliciter les éditeurs du "journal officiel" de la Convention, "The Bison's Bellow". La peine qu'ils ont prise pour assaisonner de bonne humeur le déjeuner chaque matin leur donne certainement droit aux remerciements des membres présents à la Convention.

CONCERNING THE C.S.T.A.

Notes and News

R. W. Brown (Toronto '13) has received the degree of M.Sc. in dairy plant management from the Iowa State College. He is to continue work on butter deterioration leading towards the Ph.D. degree, part of the requirements of which has already been completed.

A. M. Shaw (Toronto '10) has been elected President of the Western Canada Society of Animal Production for the ensuing year, with R. D. Sinclair (Alberta '18) Vice-President and E. Van Nice (Manitoba '20) Secretary-Treasurer.

F. B. Hutt (Toronto '23) has been granted the degree of Ph.D. by the University of Edinburgh, and has recently been appointed Associate Professor of Poultry Husbandry at the University of Minnesota.

A. Fulton (Toronto '21), Chief of Markets Division of the Dominion Fruit Branch at Ottawa, has received the appointment of permanent commercial fruit representative of the Ontario Government in Great Britain and Europe, with headquarters at the Ontario Government offices in London, England. Mr. Fulton will assume his new duties in September and prior to that time will make a survey of the Ontario fruit districts.

Conrad Turcot (Montreal '24), who is taking graduate work at the University of Wisconsin in plant breeding, has changed his address to 939 University Avenue, Madison, Wis., U.S.A.

W. J. Strong (Toronto '21) has received the degree of M.S.A. in genetics from the University of Toronto.

R. S. Willison (McMaster '21) has been appointed Assistant in Plant Pathology at the Dominion Laboratory of Plant Pathology, St. Catharines, Ont.

F. T. Wahlen (Zurich '20), Chief Seed Analyst in the Dominion Seed Branch, Ottawa, has resigned his position to accept an appointment as Director of the Swiss Agricultural Control and Experiment Station at Oerlikon—Zurich, Switzerland. Dr. Wahlen will take up his new duties on October 1st next

J. A. H. Garner (Toronto '23) Agricultural Representative under the Ontario Department of Agriculture, has been transferred from the Rainy River District to Kent County with headquarters at Chatham, Ont.

A. J. G. Maw (McGill '23), who is at present taking graduate work in poultry genetics at the University of Wisconsin, has been appointed Lecturer in Poultry Husbandry at Macdonald College, P.Q. He will assume his new duties in September.

V. S. Asmundson (Saskatchewan '18), Associate Profesosr of Poultry Husbandry at the University of British Columbia and D. G. Laird (Toronto 15), Assistant Professor of Agronomy at the University of British Columbia, have been granted leave of absence for a year in order to take a course of study at the University of Wisconsin. The mailing address of both is 308 North Murray Street, Madison, Wis., U.S.A.

F. C. Elford, Dominion Poultry Husbandman, President of the World's Poultry Science Association and Vice-President of the next World's Poultry Congress, which is to be held at the Crystal Palace, London, July 22nd to 30th, 1930, is in England spending two weeks in conference with the chief executives of the congress. Before returning to Canada, Mr. Elford will make a tour of all the southern countries of Europe, accompanied by the British Poultry Commissioner and Congress Manager, Mr. Percy Francis, and will also visit Egypt and Palestine.

A. G. Taylor (McGill '15), Poultry Husbandman at the Central Experimental Farm, Ottawa, Ont., has been appointed Secretary of the Canadian National Poultry Records Association.

J. F. Booth (Saskatchewan '19), has been appointed Commissioner of Agriculture Economics in the Dominion Department of Agriculture, Ottawa. Since 1926 he has held the position of Agricultural Economist in the United States Bureau of Agricultural Economics at Washington, D. C.

Vacancies in the Dominion Department of Agriculture

The following positions in the Dominion Department of Agriculture are being advertised by the Civil Service Commission, Ottawa:—

1. Animal Husbandman (bilingual) for the Experimental Farms Branch, Ottawa, at an initial salary of $2,040 per annum, with increases of $120 per annum up to a maximum of $2,520.

2. Senior Seed Analyst (male) for the Dominion Seed Branch at Winnipeg, Man., at an initial salary of $1,620 per anum, with increases of $120 per annum up to a maximum of $1,980.

Applications must be filed with the Civil Service Commission, Ottawa, not later than August 15, 1929.

Applications for Membership

The following applications for regular membership have been received:

Kilduff, Thomas (Alberta, 1929, B.Sc.) Edmonton, Alta.

Wilson, J. R. (Toronto, 1916, B.S.A.) Port Credit, Ont.

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